

Prehistoric Dwelling
Circular Structures in North and Central Britain c 2500 BC – AD 500

Rachel Pope

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Abstract

This thesis provides the first comprehensive study on the character and roles of the prehistoric roundhouse. As well as providing a history of roundhouse studies, the thesis also discusses those methodological and theoretical issues associated with the subject. The research focuses, however, on the analysis of a database holding c. 1200 circular structures – all excavated, published examples in Britain, north of a line from Aberystwyth to the Wash. The data spans the period from the later Neolithic until the end of the Roman Iron Age (c. 2500 BC – AD 500). Main themes addressed include: construction techniques, structural principles, structure function, use of space, house lifespans, maintenance, abandonment, and decay. From these topics come evidence for changes in house design, craft activities, domestic economy, daily routines, subsistence economy, use of landscape, social organisation, and ritual practice. Both regional and chronological trends are identified, allowing a securely based insight into everyday life in Prehistoric Britain, alongside the characterisation of regions and a broader narrative of social change. It is hoped that the thesis will encourage a return to data in prehistoric studies with a move towards an informed social archaeology.

Contents

List of Figures	vi
List of Tables	xiii
Acknowledgements	xv
Abbreviations	xvi
<u>1 Introduction</u>	1
1.1 Introduction and Background	1
1.2 A Northern History of Roundhouse Studies	2
1.2.1 1860s-1930s: Origins	
1.2.2 1930s-40s: Growth and Expansion	
1.2.3 1950s-60s: Excavation and Classification	
1.2.4 1970s-80s: Reconstruction and Function	
1.2.5 1990s: Ritualisation	
1.3 Current Trends	26
1.4 Research Aims	26
<u>2 Theory and Methodologies</u>	44
2.1 Introduction	44
2.2 Rethinking the Domestic Sphere	44
2.2.1 The Domestic-Industry Divide	
2.2.2 The Functional-Ritual Divide	
2.3 The 'Ritualisation' Trend	47
2.3.1 The Cosmological Model	
2.3.2 Deconstruction	
2.3.3 Losing Structuralism	
2.4 Towards an Informed Social Archaeology	52
2.4.1 Understanding Human Action	
2.4.2 Structure as Agency?	
2.5 Discussion	57
<u>3 Data and Methods</u>	62
3.1 Methods	62
3.3.1 Data Selection	
3.3.2 The Database	
3.3.3 Measurements	

3.3.4	Methods of Analysis	
3.2	Data Quality	74
3.2.1	The Surviving Record	
3.2.2	Excavation and Interpretation	
3.2.3	Evidence Quality	
4	<u>Design</u>	90
4.1	Introduction	90
4.2	Structure Design	90
4.2.1	The Design Process	
4.2.2	House Type	
4.2.3	House Design	
4.2.4	Size	
4.2.5	Shape	
4.3	Design Principles	108
4.3.1	Structural Systems	
4.3.2	The Optimum Ratio	
4.3.3	Post-Ring Symmetry	
4.3.4	Over-Building	
4.4	Discussion	120
5	<u>Construction</u>	167
5.1	Introduction	167
5.2	Preparation	167
5.2.1	Materials	
5.2.2	Siting	
5.2.3	Orientation	
5.2.4	Site Preparation	
5.2.5	Foundation Deposits	
5.3	Construction	180
5.3.1	The Construction Process	
5.3.2	The Framework	
5.3.3	The Walls	
5.3.4	The Entrance	
5.3.5	Thatching	
5.4	Discussion	198
6	<u>Structure Use</u>	252
6.1	Introduction	252

6.2	Internal Features	252
6.2.1	Hearths and Working Surfaces	
6.2.2	Flooring, Ring-Ditches, Drains	
6.2.3	Partitions and Furniture	
6.2.4	Pits and Alcoves	
6.3	Use of Space	259
6.3.1	Internal Space	
6.3.2	Spatial Patterning	
6.3.3	Storage Space	
6.3.4	External Space	
6.4	Structure Function	266
6.4.1	Domestic or Ancillary	
6.4.2	Food Production	
6.4.3	Craft Production	
6.4.4	Byres	
6.5	Discussion	270
<u>7</u>	<u>Maintenance</u>	
7.1	Introduction	323
7.2	Maintenance	323
7.2.1	Repair	
7.2.2	Rebuilding	
7.2.3	Re-use Deposits	
7.3	Structure Lifespans	329
7.3.1	Previous Estimates	
7.3.2	Decay Experiments	
7.3.3	Archaeological Evidence	
7.4	Discussion	345
<u>8</u>	<u>Abandonment</u>	362
8.1	Introduction	362
8.2	Abandonment	362
8.2.1	Abandonment Processes	
8.2.2	Abandonment Deposits	
8.2.3	Salvaging	
8.2.4	Destruction by Fire	
8.2.5	Post-Abandonment	

8.3	Discussion	373
9	<u>Discussion</u>	381
9.1	Introduction	381
9.2	The Roundhouse: A Narrative	381
9.3	Regional Variation	385
9.3.1	Northern Britain	
9.3.2	Central Britain	
9.3.3	North Wales	
9.4	Change Through Time	390
9.4.1	The Later Neolithic	
9.4.2	The Earlier Bronze Age	
9.4.3	The Late Bronze Age	
9.4.4	The Early Iron Age	
9.4.5	The Later Iron Age	
9.5	Later Prehistory: A Narrative	396
10	<u>Conclusions</u>	419
	Appendix 1: Gazetteer of Sites	421
	Appendix 2: Rennie (1997)	429
	Appendix 3: Finds Context	430
	Appendix 4: Odd Deposits	431
	Bibliography	440

List of Figures

Chapter 1

28-43

- 1.1 Excavated, published circular structures 1860-1999.
- 1.2 George Tate (1805-1870), the first archaeological excavator of circular structures in north and central Britain.
- 1.3 Hut Circle I at West Gunnar Peak (Northumberland).
- 1.4 Plan of the Buiston Crannog excavation.
- 1.5 A wetland structure from Glastonbury.
- 1.6 The remains of a structure at EIA All Cannings Cross.
- 1.7 Foundations of a turf walled structure at Traprain Law.
- 1.8 Internal postholes at RIA Caerau I.
- 1.9 The first reconstruction of a prehistoric circular structure: RIA Milking Gap.
- 1.10 An early double-ring structure at Old Oswestry.
- 1.11 Early open-area excavation at Voorberg, Netherlands in 1908.
- 1.12 Trends in the excavation/publication of circular structures.
- 1.13 Bersu's (1977) interpretation of LrIA Ballacagen Lough A Ph. III as a massive structure.
- 1.14 Phase I of the Iron Age structure at Scotstarvit Covert.
- 1.15 Excavation at Hayhope Knowe.
- 1.16 Milton Loch Crannog.
- 1.17 The excavation boom of the later 20th century.
- 1.18 Steer's Woodbury-style excavation of West Plean.
- 1.19 LrIA structures at West Brandon.
- 1.20 RIA Burnswark Hill.
- 1.21 Large-scale interior excavation at Burradon.
- 1.22 The multi-phase site at Hartburn.
- 1.23 The *Pimperne House*.
- 1.24 Reynolds' second *Conderton House*.
- 1.25 Large-scale excavation at Moel y Gaer.
- 1.26 Axial line symmetry at Moel y Gaer.
- 1.27 The BA hut-circle site of Cùl a'Bhaile.
- 1.28 Stake-walled structures at Crawcwellt West.
- 1.29 Reconstruction of the ring-ditch house.
- 1.30 Oswald's (1997) graph of standardised orientation.
- 1.31 Fitzpatrick's (1994) model of use of space within the roundhouse.

Chapter 2

59-61

- 2.1 The Functional-Ritual Spectrum.
- 2.2 Agent and System.
- 2.3 Structuration Theory.
- 2.4 Structure as Agency?

Chapter 3

81-89

- 3.1 Definition of regions used in the study.
- 3.2 County and regional breakdown of dataset.
- 3.3 Chronological breakdown of the dataset.
- 3.4 Structural units and spatial zones.
- 3.5 Damage type.

- 3.6 Damage and location.
- 3.7 Plough damage on slopes.
- 3.8 Plough damage and mean feature depth.
- 3.9 The growth in number of structures excavated per site.
- 3.10 The growth of poor quality data.
- 3.11 Percentage of structural data in the 'unknown' category.
- 3.12 Percentage of non-structural data in the 'unknown' category.

Chapter 4

124-166

- 4.1 A hypothetical model to explain the transfer of ideas between communities.
- 4.2 Cipriani's (1938) typology of traditional Ethiopian circular architecture.
- 4.3 A classification of traditional African circular architecture.
- 4.4 Circular house types.
- 4.5 Solutions to basic design problems in circular architecture.
- 4.6 Little Woodbury CS I and Longbridge Deverill Cow Down CS 3.
- 4.7 A Danebury stake-built structure as a beehive-and-cylinder type.
- 4.8 Crawcwellt West CS J1.
- 4.9 Green Knowe Platform 2.
- 4.10 Standrop Rigg CS 2 with post-abandonment clearance preserving the line of the turf wall.
- 4.11 Moel y Gaer CS P-R9 as a timber-walled double-ring with porch and as a turf-walled structure with internal wattle lining.
- 4.12 Moel y Gaer CS P-R16 as a stake-walled double-ring with porch and as a turf-walled structure with external stake screen.
- 4.13 Danebury CS 20.
- 4.14 An alternative reconstruction of Danebury CS 28.
- 4.15 CS14 and CS15 at Danebury with the outline of a turf wall preserved at each.
- 4.16 Size range of prehistoric circular structures in northern Britain.
- 4.17 Mean diameter according to wall type.
- 4.18 Structure type in northern Britain.
- 4.19 West Plean.
- 4.20 Size range in simple- and double-ring circular structures.
- 4.21 Pimperne.
- 4.22 West Brandon CS B.
- 4.23 Double-ring structures: non-structural outer rings.
- 4.24 The changes at Aldclune.
- 4.25 Scotstarvit Covert.
- 4.26 Piggott's (1952-53) reconstruction of Milton Loch.
- 4.27 Bersu's reconstruction model of Ballacagen Lough A Phase I.
- 4.28 Bersu's 'zone diagrams' for Ballacagen Lough A.
- 4.29 Ballacagen Lough A Phase I.
- 4.30 Ballanorris Phase I.
- 4.31 Shape of circular structures in northern Britain.
- 4.32 Structure type and shape.
- 4.33 Structure shape and post-ring symmetry in double-rings.
- 4.34 Structure type and size.
- 4.35 Depth of C-R postholes and structure size.
- 4.36 Mean dimensions of outer wall cut features and structural type.
- 4.37 Width of outer wall and C-R cut features.
- 4.38 Depth of outer wall and C-R cut features.
- 4.39 The stresses inherent in circular house types.
- 4.40 Distributing the load of the roof in a cone-and-cylinder structure.

- 4.41 Structural systems of the cone-and-cylinder structure.
- 4.42 Close-Brooks and Gibson's (1966) 'round hut near Rome'.
- 4.43 Hill's (1984) 'optimum ratio' tested against 270 double-ring structures from northern Britain.
- 4.44 Placement of internal post-ring in bulk wall double-ring structures.
- 4.45 Placement of internal post-ring in timber-built double-ring structures.
- 4.46 Structural optimums and observed placement of internal post-rings.
- 4.47 Positioning of the inner post-ring in triple-ring structures.
- 4.48 Positioning of the central post-ring in triple-ring structures.
- 4.49 Post-ring symmetry.
- 4.50 House wall type in north and central Britain.
- 4.51 Chronological change in house wall type.
- 4.52 Chronological distribution of structures where evidence for wall is absent.
- 4.53 Regional distribution of structures where evidence for wall is absent.
- 4.54 The highland-lowland division and construction materials.
- 4.55 Regional variation in house wall type.
- 4.56 Chronological change in structural type.
- 4.57 Regional variation in structural type.
- 4.58 Chronological change in structure diameter in northern Britain.
- 4.59 Chronological change in structure area.
- 4.60 Regional variation in structure area.
- 4.61 Chronological change in structure shape.
- 4.62 Regional variation in structure shape.
- 4.63 Chronological change in post-ring symmetry.
- 4.64 Regional variation in post-ring symmetry.

Chapter 5

204-251

- 5.1 Forestry and construction tools from north and central Britain.
- 5.2 Timber and wood.
- 5.3 Wood type in structural features.
- 5.4 Joinery and ties from north and central Britain.
- 5.5 Incidence of circular structures within settlements.
- 5.6 Location of circular structures in landscape.
- 5.7 Structure location: a) height above sea level; b) slope orientation.
- 5.8 House size and landscape location.
- 5.9 Height above sea level and wall type.
- 5.10 The orientation of 800 circular structures in north and central Britain.
- 5.11 The 'functional optimum' for structure orientation.
- 5.12 Seasonal changes in the 'functional optimum'.
- 5.13 Structure orientation and height above sea level.
- 5.14 A hypothetical model of prehistoric land-use.
- 5.15 Roundhouses in the landscape.
- 5.16 Orientation of enclosures in north and central Britain.
- 5.17 Methods of preparing a slope for house construction.
- 5.18 House construction in a scoop at the Dunion.
- 5.19 Building inside the scarp at Ty Mawr.
- 5.20 Placing construction activities in the prehistoric annual cycle.
- 5.21 Reynolds' construction sequence.
- 5.22 A hypothetical construction sequence for stake-walled structures.
- 5.23 Structural reconstructions of the roundhouse.
- 5.24 Mass wall height.
- 5.25 Platform scarp height.

- 5.26 Prehistoric joinery techniques.
- 5.27 Pokot agriculturalist and pastoralist structures.
- 5.28 Reynolds' technique for placing subsidiary rafters.
- 5.29 Use of purlins in traditional African architecture.
- 5.30 A technique for the positioning of subsidiary rafters involving the use of purlins.
- 5.31 Outer wall feature inclusions and fills.
- 5.32 Timber-built walls in northern and central Britain.
- 5.33 Drystone walling.
- 5.34 Mass walls in north and central Britain.
- 5.35 Door width in timber and mass walled structures.
- 5.36 Door width according to slope.
- 5.37 Door width and structure type.
- 5.38 Door width and height above sea level.
- 5.39 Entrance Features.
- 5.40 Type of door furniture.
- 5.41 Position of door furniture.
- 5.42 Doorway height.
- 5.43 Structure type and the provision of a porch.
- 5.44 Porch type.
- 5.45 Height above sea level and the provision of a porch.
- 5.46 The provision of a porch according to slope direction and structure orientation.
- 5.47 Brewster's (1963) porch reconstruction at Staple Howe.
- 5.48 Dimensions of entrance postholes.
- 5.49 Moel y Gaer P-R 25.
- 5.50 Posthole and post-pipe widths.
- 5.51 Thatching.
- 5.52 Securing the thatch.
- 5.53 Chronological variation in height above sea level.
- 5.54 Chronological variation in landscape location.
- 5.55 Chronological variation in site type.
- 5.56 Regional variation in site type.
- 5.57 MBA enclosure in north and central Britain.
- 5.58 Regional variation in height above sea level.
- 5.59 Regional variation in landscape location.
- 5.60 Chronological variation in the use of platforms.
- 5.61 Chronological variation in enclosure orientation.
- 5.62 Regional variation in enclosure orientation.
- 5.63 Chronological variation in structure orientation.
- 5.64 Regional variation in structure orientation.
- 5.65 Chronological variation in door width.
- 5.66 Regional variation in door width.
- 5.67 Chronological variation in stone wall height.
- 5.68 Regional variation in stone wall height.
- 5.69 Chronological variation in the provision of a porch.
- 5.70 Chronological variation in porch type.
- 5.71 Regional variation in the provision of a porch.
- 5.72 Regional variation in porch type.

Chapter 6

274-322

- 6.1 Hearth type in north and central Britain.
- 6.2 Internal and external hearths.
- 6.3 Fuel identifications.
- 6.4 Hearth furniture at Collfryn CS 8.

- 6.5 Height above sea level and the provision of a hearth.
- 6.6 House size and the provision of a hearth.
- 6.7 Slope direction and the provision of a hearth.
- 6.8 Structure orientation and the provision of a hearth.
- 6.9 Hearth position and structure orientation.
- 6.10 Evidence for food production and the provision of a hearth.
- 6.11 Evidence for craft production and the provision of a hearth.
- 6.12 Floor type in north and central Britain.
- 6.13 Spatial emphasis present in dual flooring.
- 6.14 Distribution of excavated ring-ditch structures in northern Britain.
- 6.15 Ring-ditch structures.
- 6.16 Internal drains at Caerau I.
- 6.17 Number of internal postholes and stakeholes.
- 6.18 Partition type.
- 6.19 The provision of partitions and height above sea level.
- 6.20 Partition type and height above sea level.
- 6.21 Slope direction and the provision of partitions.
- 6.22 Structure orientation and the provision of partitions.
- 6.23 Structure size and the provision of partitions.
- 6.24 Structure size and type of partition.
- 6.25 Radial divisions at Thorpe Thewles CS C.
- 6.26 Sleeping arcas at Bridge House CS 1 & CS 2.
- 6.27 The provision of pits in circular structures.
- 6.28 Internal and external pits.
- 6.29 How use of space influences structure design.
- 6.30 Periphery width in double-ring structures.
- 6.31 The cosmological model.
- 6.32 Use of space in the hogan and ger.
- 6.33 How light falls in the average prehistoric circular structure.
- 6.34 The distribution of light throughout the day.
- 6.35 Scheme used in spatial analyses.
- 6.36 Hearth position.
- 6.37 Position of pits within circular structures.
- 6.38 Position of finds within circular structures.
- 6.39 Association between hearths and pits.
- 6.40 Spatial patterning in dual flooring.
- 6.41 Spatial patterning in position of hearths, pits and finds.
- 6.42 Distribution of finds and plant remains at South Shields.
- 6.43 Spatial patterning at South Shields.
- 6.44 Basic frameworks for an upper floor based on the main ring-beam.
- 6.45 Vertical use of space in the average prehistoric structure.
- 6.46 Use of external space.
- 6.47 Subsistence finds in circular structure contexts.
- 6.48 Non-subsistence finds in circular structure contexts.
- 6.49 Finds context: formation.
- 6.50 Finds context: spatial.
- 6.51 Finds type.
- 6.52 Implied activities.
- 6.53 Multi-functionality in prehistoric circular structures.
- 6.54 Structure function and multi-functionality.
- 6.55 Coincidence of finds types.
- 6.56 Finds type and height above sea level.
- 6.57 Alternative models of the average use of space in prehistoric structures.
- 6.58 Chronological variation in the provision of a hearth.
- 6.59 Chronological variation in hearth position.
- 6.60 Regional variation in the provision of a hearth.

- 6.61 Regional variation in hearth position.
- 6.62 Chronological variation in hearth type.
- 6.63 Regional variation in hearth type.
- 6.64 Chronological variation in hearth position.
- 6.65 Regional variation in hearth position.
- 6.66 Chronological variation in the provision of pits.
- 6.67 Regional variation in the provision of pits.
- 6.68 Chronological variation in the provision of partitions.
- 6.69 Chronological variation in partition type.
- 6.70 Regional variation in the provision of partitions.
- 6.71 Regional variation in partition type.
- 6.72 Chronological variation in floor type.
- 6.73 Regional variation in floor type.
- 6.74 Chronological variation of spatial emphasis in dual flooring.
- 6.75 Chronological variation in the patterning of dual flooring.
- 6.76 Regional variation of spatial emphasis in dual flooring.
- 6.77 Regional variation in the patterning of dual flooring.
- 6.78 Chronological variation in the occurrence of occupation deposits.
- 6.79 Regional variation in the occurrence of occupation deposits.
- 6.80 Chronological variation in the provision of internal space.
- 6.81 Regional variation in the provision of internal space.
- 6.82 Chronological variation in use of external space.
- 6.83 Regional variation in use of external space.
- 6.84 Chronological variation in structure multi-functionality.
- 6.85 Regional variation in structure multi-functionality.
- 6.86 Chronological variation in structure function.
- 6.87 Regional variation in structure function.

Chapter 7

350-361

- 7.1 Maintenance activities in timber-built structures.
- 7.2 Maintenance activities in stone-built structures.
- 7.3 Rebuild activity and height above sea level.
- 7.4 Rebuild activity and structure location.
- 7.5 Maintenance activity and landscape position.
- 7.6 Maintenance activity and height above sea level.
- 7.7 The physical decay of felled wood following insect attack.
- 7.8 Developed post-end decay in the seasonally flooded *New Bewick Grubenhäus* at Bede's World in Jarrow, Tyne & Wear.
- 7.9 Differential decay in outer wall and central-ring posts.
- 7.10 The formation processes surrounding sapwood decay in a posthole.
- 7.11 Differences between average posthole and post-pipe width.
- 7.12 Storm damage at Bede's World in Jarrow, Tyne & Wear.
- 7.13 Evidence for the re-cutting of drainage gullies.
- 7.14 Incidence of factors which might be considered to represent longevity.
- 7.15 Wear on the courthouse stairs at Inveraray Jail, Argyll.
- 7.16 Wear on the New Prison doorstep at Inveraray Jail, Argyll.
- 7.17 Structural elements repaired in timber- and stone-built structures.
- 7.18 Chronological distribution of maintenance and abandonment.
- 7.19 Regional distribution of maintenance activities.
- 7.20 Regional distribution of multiple rebuilds.
- 7.21 Chronological distribution of maintenance activities.
- 7.22 Chronological distribution of multiple rebuilds.

Chapter 8

376-380

- 8.1 Characterisation of prehistoric floor assemblages.
- 8.2 The proportion of utilitarian and valuable/personal finds on floors.
- 8.3 Finds type and context.
- 8.4 Main changes in the composition of the Bowburn Study deposit.
- 8.5 Chronological variation in finds context: formation.
- 8.6 Regional variation in finds context: formation.
- 8.7 Chronological variation in finds context: spatial.
- 8.8 Regional variation in finds context: spatial.

Chapter 9

399-418

- 9.1 A typology of prehistoric architectural forms.
- 9.2 Those features specific to each region.
- 9.3 Regional variation in modern weather.
- 9.4 Modern, optimised agricultural land-use.
- 9.5 Similarities between regions.
- 9.6 Dominant structure type and mean diameter through time.
- 9.7 Prehistoric architectural traditions.
- 9.8 Characterisation of regions.
- 9.9 Location and orientation.
- 9.10 Settlement type and settlement system.
- 9.11 Design features.
- 9.12 Main structure types through time.
- 9.13 Main trends in the later prehistory of north and central Britain as revealed by the domestic evidence.
- 9.14 Early developments in walled circular architecture.
- 9.15 Number of circular structures: chronological breakdown.
- 9.16 Growth rate.
- 9.17 The shifting focus of pastoralist settlement north of the Humber.
- 9.18 Number of circular structures per site: chronological breakdown.
- 9.19 Number of sites: chronological breakdown.
- 9.20 Regional and chronological breakdown of number of circular structures.

List of Tables

1.1	Gardner & Savory's (1964) classification.	14
1.2	Feachem's (1965) classification.	14
1.3	Jobey's (1966) classification.	16
3.1	Distorter sites and the fields in which each has the potential to distort.	64
3.2	Main ethnographic examples of circular architecture used in the study.	72
3.3	Main experimental reconstructions used in the study.	73
3.4	Finds incorporation by context according to structure life-cycle.	74
3.5	Above and below average incidence of finds type according to context.	74
4.1	Range in diameters according to wall type and structural type.	102
4.2	The provision of a main ring-beam in circular structures.	115
5.1	Evidence for the squaring-off of central-ring posts.	171
5.2	Data on different thatch types from Buster constructs.	173
5.3	Evidence for seasonal structures in the orientation data.	177
5.4	The functional optimum for orientation according to season.	177
5.5	Seasonal structures in the landscape from the orientation data.	177
5.6	Seasonal use of the prehistoric landscape.	177
5.7	Wall height reconstructions.	184
5.8	Structurally sound arrangements of roof pitch and wall height.	187
5.9	Main structure types in north and central Britain.	200
5.10	Chronological and regional variation in choice of slope.	241
6.1	Potential loom arrangements in north and central Britain.	257
6.2	Mean area of annular spaces in circular structures.	260
7.1	Circular structures with multiple rebuilds.	326
7.2	Conditions conducive to the reproduction of wood decay organisms.	333
7.3	Average lifespans of thatch.	337
7.4	Weight and strength loss according to rot type.	338
7.5	Percentage failure of stakes and strength lifespan.	338
7.6	The comparative failure of hardwood stakes according to soil type.	338
7.7	Durability of British archaeological wood types.	339
7.8	Percentage failure of 0.10 x 0.05 m diameter posts.	339
7.9	Wear on stone at Inveraray Jail.	345
7.10	Summary of information regarding lifespan estimates.	346
8.1	Lightfoot's (1993) development of Stevenson's (1982) hypothesis.	364
8.2	Indicators for planned/unplanned abandonment.	364
8.3	Treatment of burnt down structures.	370
9.1	Summary table revealing links between regions.	386
9.2	Chronological characterisation.	407

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Abbreviations

Site/General

CS	circular structure
Plat	platform
Pd x	Period x
Ph x	Phase x
SE	simple enclosure
EE	elaborate enclosure
HOD	height above sea level

Chronological

LrNeo	later Neolithic
EBA	Early Bronze Age
MBA	Middle Bronze Age
LBA	Late Bronze Age
LtBA	Latest Bronze Age
EIA	Early Iron Age
LrIA	Later Iron Age
LtIA	Latest Iron Age
RIA	Roman Iron Age

Regional

HS	Highland Scotland
IS	Irish Sea Region
NS	North Sea Region
YP	Yorkshire Pennines
MP	Midland Plain
NW	North Wales
T-F	Tyne-Forth
S-C	Solway-Clyde

Structural

S-R	simple-ring
D-R	double-ring
T-R	triple-ring
W-S	wall-slot
C-T	contiguous timber
Ph	posthole
Sh	stakchole
P-B	post-built
S-B	stake-built
SW	stone wall
R-B	ring-bank
O wall	outer wall
P-R	post-ring
C-R	central-ring
I-R	inner-ring
D-G	drainage-gully
R-D	ring-ditch
W-G	wear-gully

Spatial

P	periphery
IZ	inner zone
FL	front left
FC	front centre
FR	front right
CL	centre left
C	centre
CR	centre right
RL	rear left
RC	rear centre
RR	rear right

This research is for O.G.S. Crawford.

**It is also for the women of prehistory: with the hope that your labours
were valued more in your own time than they have been in mine.**

**"Our aim is the reconstruction of past life, and since that
centres on the house, we are particularly interested in houses"**

(Crawford 1953, 145)

Chapter 1 Introduction & Background

"We gladly catch the faintest rays which are reflected from laborious investigations into heaps of stones and ruined walls and houses"
(Tate 1861, 310)

1.1 Introduction

Musson (1970a) stated that there were c. 200 Iron Age roundhouses known in the archaeological literature. Thirty years on and there are now c. 1200 roundhouses of all ages published in north and central Britain alone. This research provides a much-needed synthesis of the huge dataset now available on prehistoric circular architecture. A large, multi-period dataset uses evidence on structure design, construction techniques, structural principles, structure function, use of space, house lifespans, maintenance, abandonment, and decay to provide information on various themes including food production, craftworking, the subsistence economy, use of landscape, social organisation, and ritual practice. The result is a more integrated understanding of everyday life in the domestic sphere and the evidence also allows for the characterisation of regional variation and long-term social change. It is now fifty years since O.G.S. Crawford's statement that the house was the key to understanding past life; it is hoped that this thesis provides a significant contribution to just that.

This chapter places the thesis in context by providing a background to the field of roundhouse studies from its earliest origins. The third section gives a brief consideration of recent trends in the field and the chapter ends by outlining the aims of the author's own research. Chapter 2 discusses the author's theoretical standpoint and research priorities. Chapter 3 discusses the methods employed in data collection and analysis, as well as data quality. Chapters 4 to 8 use data analysis alongside evidence from ethnography, experimental archaeology, structural engineering, and wood microbiology to tell us about the design, construction, use, maintenance, and abandonment of the roundhouse. Chapter 4 takes us through the design process: from design concept to house type, size and shape. Chapter 5 discusses the construction process from choice of site and materials to the details of construction. Chapter 6 discusses the 'furnishing' of the structure: its internal features, how space and light are utilised and what activities take place inside and out. Chapter 7 discusses the decisions surrounding maintenance: whether to repair or rebuild; how long a structure lasts and how long it is used for. Chapter 8 discusses the reasons for structure abandonment and what happens on abandonment, to structure collapse and decay. At the end of each chapter the discussion section will summarise the main points and discuss chronological and regional trends. Chapter 9 summarises the results of the study with three different narratives: one general, one regional, one chronological; and Chapter 10 provides a conclusion to the thesis.

1.2 A Northern History of Roundhouse Studies

In recent years we have been told that until Bersu's excavations at Little Woodbury, it was commonly believed that people in prehistoric Britain had lived in pit-dwellings (Evans 1989, 438). As is often the case in recent years, the term 'Britain' is used to refer to an area more accurately described as south central England. In fact, in the harder geologies of northern Britain the concept of the 'pit-dwelling' had never caught on in the first place (Ralston forthcoming). In fact, it was only in southern, dryland Iron Age contexts that it gained any ground at all. By 1940 – when Little Woodbury was published – archaeologists working in north and central Britain had already published 127 circular structures – at least thirty-two of them believed to be Iron Age in date – from no less than thirty-eight sites. The problem was that many archaeologists working in the south – then, as now – tended to keep their heads firmly buried in the Wessex chalk. This section will present a history of roundhouse studies from a northern perspective, in an attempt to redress the balance.

By 1930, the majority of published circular structures excavated in north and central Britain were RIA in date and just fifteen structures were pre-Iron Age in date (fig. 1.1). Excavations had concentrated on enclosed hut-circles – a construction form at its most popular in the RIA – and stone-built circular structures overlying hill-fort defences. This concentration on RIA structures began to decline, however, during the 1930s-40s. With the growth of open area excavation, more timber-built structures were located and during the 1950s-60s more than three quarters of published structures were of Iron Age date, although still only eighteen structures, however, had a secure Bronze Age date. Matters improved however in the 1970s-80s when almost one quarter of published structures were of pre-Iron Age date. Pivotal in this shift were the excavations at Moel y Gaer (Flints.) and Dryburn Bridge in East Lothian (Guilbert 1975b; 1976; Triscott 1982). Fifteen structures were even dated to the later Neolithic and its transition into the EBA. In the 1990s, excavation of RIA structures was at an all time low with only three RIA structures published at the time of this study. Alongside this has been a rise in the number of Iron Age structures, predominantly because of the large-scale excavations at Coton Park in Warwickshire (Chapman 1998) and at Woodend Farm in Dumfries & Galloway (Banks 1995).

1.2.1 1860s-1930s: Origins

In the 19th century, archaeology was very much in its infancy and antiquarianism generally remained the preserve of the wealthy classes, with excavation merely the way to acquire ancient relics for private collections. It was an exciting time in the Sciences and ancient artefacts promised a wealth of information for the investigation of evolutionary theory. Research

questions, inspired by classical studies and dictated by the time, revolved around the topics of race and migration, invasion and defence. Antiquarianism became an increasingly popular pastime of the educated classes. The Berwickshire Naturalists' Club had an active field element from an early date. So too did the Anglesey Antiquarian Society, the members of which were conducting rescue excavations as early as the 1930s. It is perhaps not too surprising then to find that these are also the areas where a greater number of recorded structures survive in the record. At this time circular timber architecture was unknown and study was concentrated on upstanding stone hut-circles.

In 1885, the Berwickshire Naturalists already had around 400 members. It is perhaps no coincidence then that Northumberland is where both northern roundhouse studies began in the late 19th century and where the field made most progress in the late 1930s. Victorian ideals of education as progress meant that roundhouse studies got off to quite a sophisticated start with high standards of research, excavation, recording and publishing. In the early 20th century, however, excavation techniques resorted to a combination of wall-chasing - eg at Din Lligwy on Anglesey (Baynes 1908) - and hut-circle 'clearing', where the hut-circle is targetted for excavation and the interior - as defined by the inner face of the stone wall - is cleared. The latter is seen most extensively at the sites of Braich y Dinas in Conwy (Hughes 1912; 1922) and the 1912-13 excavations at Ty Mawr on Anglesey (Smith 1985). Structures were not excavated to natural as - as with Roman sites - the aim was simply to expose the stone wall.

George Tate

The first comprehensive recording and publishing of hut-circles in North and Central Britain can be found in Northumberland, in the work of George Tate (fig. 1.2). Tate was President and then Secretary of the Berwickshire Naturalists' Club, reportedly a man of ardent spirit and enthusiasm, he was an advocate of social reform, in particular of education (Middlemas 1869-72). Tate was a 'scientific man'; primarily a geologist but with learned interests in palaeontology, geography, archaeology, local history and the sciences (*ibid*). It seems that Tate spent no more than four years - perhaps only two - investigating later prehistoric settlement, culminating in his excavations at Greaves Ash and Yeavering Bell in Northumberland (Tate 1861; 1862). In this short time he managed to excavate no less than twelve structures in seven different settlements. Tate was very much ahead of his time: more archaeologist than antiquarian, he stated his position thus:

"some object of peculiar significance may turn up; but it is more by the accumulation of facts made known by the extensive and systematic application of the pick-axe and spade, that we can hope to arrive at sound general views respecting the military and domestic arrangements, and the habits and character of pre-historic times"

(Tate 1862, 433)

Tate's reports are characterised by his careful description of the hut-circles. For the first time, rather than just the finds, the structures themselves received recording and discussion. For interpretation, he turned to the classical sources but he also used ethnographic parallel. He considered hut-circle survival, their structure and the nature of their roofing, as well as discussing the implications of structure orientation. Perhaps inspired by Tate, in the 1870s, John Turnbull – also a member of the Berwickshire Naturalists' Club – was excavating hut-circles at the broch settlement of Edin's Hall in Berwickshire (Turnbull 1879). In Aberdeenshire, Christian Maclagan was doing the same at her site of Bennachie (Maclagan 1881).

George Rome Hall

George Tate had set a good standard for settlement archaeology in Northumberland, one that was improved on by the Reverend George Rome Hall some twenty years later, at the sites of Carry House Camp and West Gunnar Peak (Rome Hall 1880; 1884). Both sites were meticulously recorded - Rome Hall's plans are of a very good standard even today. In his work at West Gunnar Peak (fig. 1.3) he recorded not only the dimensions and structural features of the hut-circles but also the spatial arrangements of their interiors, even marking on the position of small finds. Rome Hall considered domestic activities at length: analysing spatial arrangements and lighting within the structures. He was very interested in cooking technology, which he discussed with reference to ethnographic analogy. He even touched on phenomenology.

Aside from hut-circles, roundhouse studies had early beginnings in wetland archaeology. In late 19th century Scotland, Robert Munro – a doctor by trade - was heavily involved in research into crannogs and his 1882 *Ancient Scottish Lake Dwellings or Crannogs* records the first circular timber structures (fig. 1.4). Slightly later, Arthur Bulleid (1894) recorded others at the Glastonbury Lake Village in Somerset (fig. 1.5). In 1910 Bulleid and Harold St. George Gray – a former assistant to Pitt-Rivers - began excavations at another wetland settlement at Meare, and Glastonbury was published in 1911 and 1917. Nevertheless, the link between wetland architecture and dryland archaeology was not made. Cunnington (1923) did not recognise the post-built structure she and her husband had excavated at All Cannings Cross in Wiltshire (fig. 1.6) and instead interpreted some of the larger pits as dwellings. Elsewhere, the continued focus on hut-circles, combined with *chase-and-clear* techniques, meant that it would still be a number of decades before circular timber architecture in a non-wetland context would be fully understood.

In the early 20th century, prehistoric studies was still heavily reliant on the historical texts. Classically educated researchers believed that Caesar's references to Belgic migrations would

naturally be identifiable in the archaeological record (cf. Bezant Lowe 1912). Between 1912 and 1925, the *Invasion Theory* was being developed by J. Abercromby, O.G.S. Crawford and H. Peake who believed that they had evidence in the burial record for a series of three invasions from the continent in the late 2nd and 1st millennia BC (Cunliffe 1991). This worked alongside a gradual increase in the number of excavations, for example the extensive work of Cunnington on the hillforts of Wiltshire between 1908 and 1917. Despite the growing number of excavations, the new theoretical focus had displaced the early objectives of Tate and Rome Hall and progress in roundhouse studies slowed. Greater emphasis was placed on the excavation of hillfort ramparts, presumably because of their secure Iron Age date.

Alexander Curle

Modern excavation techniques had started forming in the late 19th century, for example with the work of Pitt-Rivers at Cranborne Chase in the late 1880s, where the idea of area excavation began to be developed (Thompson 1977). In 1922, Alexander Curle and James Cree examined the first stone foundations of a circular structure using area excavation (fig. 1.7). Traprain Law (East Lothian) was dug between 1914-1915 and 1919-1923 with an average area of 15 m x 30 m (450 m²) under excavation each season. In total 3150 m² was excavated, unparalleled until the work of George Jobey at Burradon. Unfortunately, the excavations were less than successful at deciphering what was undoubtedly a very complex site. The decision to dig down onto four pre-established levels meant that Curle and Cree failed to identify anything but the most obvious of features. Despite numerous hearths, areas of paving and at least two stone-founded circular structures; no negative features were discovered. The experimental excavation strategy and interim publishing, means that the prehistory of Traprain Law is difficult to understand and a reappraisal of Curle and Cree's work is now overdue.

A.O. Curle was responsible for a further breakthrough in roundhouse studies; during the 1920 excavation of the broch of Dun Troddan, Inverness-shire he interpreted a ring of roof-supports for the first time. According to Ralston (forthcoming), this is "a seminal moment in the recognition of coherent timber architecture in the Scottish prehistoric record". Postholes had already been recognised by David Christison in his 1901 work on Roman signal stations in Perthshire and rectilinear timber structures had been identified at the Roman site of Castlecary in 1903 (*ibid*). Curle's brother James was a Romanist and Curle must have been aware of the structural implications of the posthole, he certainly recognised them in the rampart at Bonchester Hill in 1906 (Curle 1909-10). Whilst revolutionary, the effect of Curle's 'post-ring' only gradually filtered through to excavators of non-Atlantic structures. The gradual development of excavation techniques and interpretation of archaeological features meant that by 1930 the stage had been set for real progress in roundhouse studies.

1.2.2 1930s-40s: Growth and Expansion

By the 1930s and 1940s, Iron Age studies had developed a firm theoretical agenda. In the early 1930s, Christopher Hawkes had begun to develop the earlier *invasion theory* models. His ABC chronology still identified three invasion horizons but they were now dated to the 6th, 4th/3rd and the 1st centuries BC (Hawkes & Dunning 1931). Hawkes believed the proof for these invasions lay in the finding of cordoned pottery and La Tène brooches on both sides of the channel. Following the work of Hawkes, there was a rash of excavation as archaeologists now had a chronological framework in which to set their findings. Activity was centred on Iron Age settlement sites and the resulting mass of data meant that excavators – in particular Mortimer Wheeler (1935) and Kathleen Kenyon (1950; 1952) – attempted to modify Hawkes' scheme to fit in with their own excavations. Continental invasions were also envisaged for Scotland by V.G. Childe (1935) in his *Prehistory of Scotland*. Clark (1966) suggests that at this time prehistoric archaeologists were suffering from a form of 'invasion neurosis':

"So sure were prehistorians that every new thing must have come from the Continent that even quite vague similarities sufficed to define and denote not merely culture contact but actual invasion. In the final stage of the neurosis hypothetical invasions became so real that they, instead of the archaeological material itself, were actually made the basis of classification"

(Clark 1966, 173)

Roundhouse studies, however, remained largely untouched by theoretical moves at this time. Despite Curle and Cree's work at Traprain, the majority of excavators continued to explore hut-circles by employing the *chase-and-clear* method. In the early 1930s, hut-circle studies continued to flourish with the work of Charles Phillips and his excavations of Parc Dinmor and particularly at Pant-y-Saer (Phillips 1932; 1934). His surprisingly modern reports consider human action, use of space, formation processes and domestic activities. Phillips also went on to help in the excavations at Little Woodbury (Bersu 1940). By the early 1930s excavators were certainly aware of the possibility of timber supports in circular architecture. W. Thorneycroft – a friend of Gerhard Bersu – on discussing CS F at Dalrulzion (Perthshire), states: "No post-holes were observed by me at this place, although I looked for them" (Thorneycroft 1932-33, 196). It is unclear exactly when Thorneycroft's CS Q was excavated, it *may* be the earliest example of a ring of roof supports in a non-Atlantic, dryland context, however the structure was not published until 1945 and our understanding suffers from the small, schematic plan.

Whilst in southern England the idea of the Iron Age pit-dwelling was gaining ground, the concept was rejected by some and real progress was made in roundhouse studies, particularly in

Sussex. Following Cunnington's publication of All Canning's Cross, Garnet Wolsley (1927) recognised post-built circular structures at the Iron Age site of Park Brow in Sussex. By way of comparison he cited an example of timber architecture from the La Tène site of Lochenstein in Württemberg, Germany. In 1930 a Society of Antiquaries Report stated that there should be an increased number of excavations of prehistoric habitation sites (Evans 1989) and in 1932, Hazzledine Warren published a short account of his 1907 finding of several preserved, pre-Roman 'wooden hut-circles' off the Lincolnshire coast (Hazzledine Warren 1932). By the mid 1930s, E.C. Curwen had excavated a number of post-built 'round huts' in Sussex at the Late Bronze Age sites of New Barn Down (Curwen 1934) and Plumpton Plain (Holleyman & Curwen 1935).

B.H. St. John O'Neil

In north Wales, Brian O'Neil's 1933-34 excavations at Caerau I (fig. 1.8) in Gwynedd and later at Porth Dafarch on Anglesey (O'Neil 1936; 1940) reveal the first published example of postholes as roof-supports within a hut-circle. In 1933-35 O'Neil excavated at the Breiddin in Powys (O'Neil 1937). Like most at this time, his excavations concentrated on the defences but he does describe two timber circular structures. In his plan of the New Pieces trench, O'Neil links together seven postholes in a polygonal manner where they surround a hearth and suggests that they define a 'hut'. Recognisable today as a post-ring, whether O'Neil himself saw this as circular architecture is unclear, although free-standing timber circular structures had already been published by Wolstey and Curwen in Sussex. A similar situation is found at the site of Mansfield Woodhouse in Nottinghamshire - excavated between 1936-39 - where Adrian Oswald (1949) identified two rather odd-shaped ovoid 'huts' beneath the corridor house of the Roman villa. A slightly confused interpretation disguises what would be recognised today as circular structures. Certainly by the mid 1930s, excavators were alive to the possibility of timber-built circular architecture.

Caerau was published in the *Antiquaries Journal* in 1936; its clear plans and solid discussion meant that, by the late 1930s vertical timbers were accepted as a major component in hut-circle architecture. At the same time, we have timber-built circular structures *almost* being recognised as such in Roman contexts. O'Neil sees the 'courtyard settlements' as the result of the *Pax Romana* and suggests that they were set up by either the Romans themselves or by their camp-followers (O'Neil 1936). This being the case, it is perhaps not too surprising to find that O'Neil interprets postholes as a structural element. As mentioned above, recognising postholes as structural evidence had already been well established in Roman contexts. If O'Neil saw the RIA settlements at Caerau as being of direct Roman influence, he would not have any difficulty in applying principles of Roman timber architecture to them.

Thomas Wake & H.E. Kilbride-Jones

After the variable results of Curle and Cree at Traprain it was some years before large-scale trench excavation was attempted again. B.H. St. John O'Neil, however, used expanded slip trenches at the 1933-35 excavations of the Breiddin in Powys (O'Neil 1936) as did William Jones Varley – a friend of O'Neil - in his 1936-38 excavations at Castle Ditch in Cheshire (Varley 1951). Varley expanded his rampart slip trench to investigate some of the interior and opened up a c. 23 m x 27 m (620 m²) trench over three seasons. Similar methods were being used in Northumberland. In June 1936, Thomas Wake – on behalf of the Northumberland County History Committee - excavated Witchy Neuk. After using a slip trench to investigate the rampart, he opened up a 7.5 m x 16.5 m trench (49 m²) with the distinct purpose of investigating circular structures in the interior. Thomas Wake was also the first to identify wall-slots. He describes both the 'hut circles'¹ as being outlined by a shallow trench with closely-set packing stones. The following quote reveals that he had a good understanding of prehistoric circular timber architecture and that this understanding was informed by ethnographic analogy: a growing trend that sat well with pre-war functionalism (Evans 1989):

"The stones set in the trench forming the edge of the huts could not have been used as foundations for a low wall. It may be suggested that stakes were used for the supports of the roof. These would be kept firm by the packing stones in the trench . . . This style of hut can be inferred from the illustrations of native huts in *Antiquity* [1930]"

(Wake 1939, 134)

Wake, however, didn't publish until 1939. In 1937, Howard Kilbride-Jones excavated the Roman Iron Age enclosed settlement of Milking Gap. More ambitious than Wake, between August and October, Kilbride-Jones excavated a trench measuring c. 27 m x 38 m (1026 m²) – more than three quarters of the settlement. The Milking Gap structures comprise two main elements: a heavily spread stone wall and a post-ring associated with the internal face. Kilbride-Jones sees the two elements as being contemporary and sees the *posts* as the load-bearing element: "we may assume that the rafters were anchored to the tops of the posts" (1938, 337) with the stone walls having a very minor structural role. So even though a stone wall is present, it is the *timber* features which are interpreted by Kilbride-Jones as the main structural element (fig. 1.9). Milking Gap was published in *Archaeologia Aeliana* in 1938. With its excellent plans, highly detailed description and thought-provoking discussion and interpretation, the report cannot have failed to be influential and it is interesting that many ideas later attributed solely to Bersu (1940) are present in the Milking Gap report.

The work of Bersu (1940; 1948a) represents the dawn of the modern era in prehistoric settlement studies. After a promising start in the later 19th century, the discipline had essentially floundered through lack of direction. What had been established in Sussex, north Wales and Northumberland by the late 1930s was that timber-built circular architecture could be Bronze Age, Iron Age or RIA in date but progress in the field was slow and reliant on individual researchers with local agendas. More generally, prehistoric studies was still focused on identifying continental invasion and immigration, warfare and defence with excavation consisting mainly of driving slip-trenches through hillfort 'defences' to elucidate phasing. In the 1930s, there was growing discontent in Iron Age Studies. At this time, archaeology was not recognised as a national responsibility, and - bar privately-funded research - the *Society of Antiquaries of London* held a monopoly over large excavation projects. Their principal fieldworker was Mortimer Wheeler who remained a defender of the pit-dwelling concept (Evans 1989). Rather than look to the north or to Bronze Age studies, the younger generation looked instead to the near continent where settlement archaeology was generally more advanced (cf. Clark 1937).

Archaeologists on the continent had been using an open-area approach to excavation for decades, such as in the work of J.H. Holwerda in the Netherlands (fig. 1.11). The art of revealing structures through recording post-holes in plan was a technique that was being carried to a high standard in Germany during the 1930s (Thompson 1977; Evans 1989). In 1935, the *Prehistoric Society* was established: a *national* society. By 1937 Graham Clark had stated that the lack of prehistoric structures in Britain - particularly in the early prehistoric period - was 'deplorable' and that the excavation of prehistoric houses should be considered a 'prime aim' (Clark 1937). The excavation of Little Woodbury was planned by Grahame Clark, the Hawkes, and the Piggotts (Evans 1998; Hill 2000) to breathe new life into prehistory and Iron Age Studies in particular. Bersu was selected to lead this 'orchestrated agenda of settlement archaeology' (Evans 1998). His knowledge of post-built structures and plan excavation would jumpstart the much-wanted transformation from Wheeler's section-based historicism to a plan-based *sociological school of excavation* (Evans 1989; 1998).

Between 1939-40, Varley - with St. John O'Neil - excavated what might be seen as a large double-ring structure at Old Oswestry in Shropshire. The original structure may have been comparable in size to the Little Woodbury structures (fig. 1.10) but Varley's c. 9 m x 9 m (81 m²) trench was located primarily across the ramparts and the house plan was not, it seems, completely exposed. The structure remained unpublished until 1994. Exploring the interior was

¹ The term hut-circle is now only used to describe stone-built structures.

still an afterthought for Varley; for Bersu it was the primary aim. At Little Woodbury, one third of the non-hillfort settlement was excavated in nine 5 m wide strips over two seasons in 1938 and 1939 and two large post-built roundhouses (*c.* 12 m in diameter) were exposed. By excavating Little Woodbury to a high, technical standard, Bersu recognised concentric rings of postholes as the remains of large circular timber houses. Bersu combined large-scale excavation with the detailed recording of features and deposits and through his high standards, Bersu brought new direction to a field which had been stumbling to find itself during the 1930s. In the 1940s the Hawkes paraded Woodbury as the prime exemplar of the new form of excavation (Evans 1998). Little Woodbury quickly became the type-site for Iron Age settlement and thus for later prehistoric architecture.

Following Little Woodbury, Bersu seems to have been deliberately targeting large structures: 'the big buildings of the aristocracy' (Evans 1989, 195). Between 1941–43, he went on to dig two sites at Ballacagen Lough (fig. 1.13) and another at Ballanorris on the Isle of Man. His work helped bring the number of structures excavated in the Irish Sea Region to a level almost at a par with the North Sea Region (fig. 1.12). With these Manx structures Bersu saw a developed architectural type: the massive roundhouse. The diameters of these structures were interpreted as being between 20–25 m. Bersu became concerned with the relationship between surface and excavated remains - no doubt influenced by the fact that his wife, Maria Bersu, was an excellent surveyor. Between 1946 and 1948, Bersu excavated the sites of Scotstarvit Covert and Green Craig in Fife and Llyn-du Bach in Gwynedd believing that he had found another massive-structure in Scotstarvit (fig. 1.14). Bersu advocated reconstruction as a way of clarifying details of construction (Bersu 1940, 84) but the massive structures were never re-built - except as models - as Bersu died in 1964 even before the Manx report was finished. The report finally came out in 1977 and whilst detailed, it is both convoluted and confusing. As a result, Bersu's massive-roundhouse model has remained largely unchallenged.

The current author has found that the massive-interpretation of both the Manx sites and Scotstarvit can now be brought into question (see 4.2.4). Nevertheless, Bersu proved that large circular architecture - even if the houses were not quite as big as he believed - were not just the preserve of southern England. As such, Ian Ralston (forthcoming) sees the 1948 Scotstarvit report as a 'significant threshold' in the study of Scottish roundhouses; one which laid the foundations for a modern era, where dryland sites in the ploughzone were to be considered alongside the evidence from crannogs and hut-circles. Bersu's post-war excavations are thorough and his well-illustrated reports and rapid publication set a good standard for modern Prehistoric studies. Unfortunately, the theoretical mood of the time meant that northern roundhouse studies eventually became entangled in the principles of invasionism: the "focus on [large] timber round-houses redirected study of the Scottish Iron Age on its real or imagined southern links" (Ralston forthcoming). Roundhouse studies - pre-occupied with the politics of

the 'Woodbury Operation' - had remained largely untouched by theoretical developments until the late 1940s with the work of Peggy Piggott.

Peggy Piggott

With Little Woodbury as the Iron Age type-site, the bias of an already south-centric framework was about to reach new heights. So much so, that Stuart Piggott (1966) stated that Scotland was seen as a 'culturally retarded' periphery by researchers to the south. So much emphasis had been placed on ceramics typologies in the 1930s as evidence for continental invasion that the apparently largely aceramic cultures of northern Britain were simply ignored by the popular theory. In Cyril Fox's *Personality of Britain* (1932), northern and western Britain - with harsh climate and inferior soils - were seen as the poor cousins of the south and east; very much reflecting political attitudes of the time. As a development of Hawkes, Childe (1935) saw Belgic immigrants travelling to Scotland as well as England, but he also talked of the *diffusion of culture* from south-west England to south-west Scotland and the north. In 1949, Varley and Hawkes had envisaged a series of 'diffusions' into Wales from the areas of the Belgic migrations (Varley 1950, fig. 7). In the same year, C.M. Piggott had seen development in the north as the product of the migration from the more 'civilised' south.

Having worked with Bersu at Little Woodbury, Piggott undertook excavations at the sites of Hownam Rings, Hayhope Knowe, and Bonchester Hill in the Scottish Borders (Piggott 1947-48; 1948-49; 1949-50). Her excavations were in reaction to a 1948 CBA policy statement regarding the misleading nature of settlement classification from surface remains (Piggott 1947-48). Piggott used targeted excavation in an attempt to get to grips with a chronological sequence of settlement architecture and her *Hownam Sequence* has only quite recently been brought into question. Piggott gave the roundhouse an important role in settlement excavation and set a new standard for northern prehistory, especially through her work at Hayhope (fig. 1.15). For roundhouse studies, the Hayhope-Hownam excavations implied the possible elucidation of a typological development of house types as well as settlement types. Her reconstruction drawing of a Hayhope house was remarkably advanced for the time, with all but roof pitch accurate by today's standards. At Hownam, Piggott discussed archaeological survival, recognising for the first time the problems of erosion on slopes and the vestigial nature of timber features. In her Hownam report, Piggott begins to develop the work of Hawkes, thinking about the diffusion of 'fashion' northwards, or the migration of an élite; as opposed to change as the result of a mass-migration of people (*ibid*).

Piggott's 1953 excavation of the Milton Loch crannog (Piggott 1952-53) in Dumfries & Galloway is a remarkable piece of work. As with her earlier excavations, the site saw rapid

publication with the report containing both high quality plans and a reconstruction model (figs 1.16 & 4.26). Her structural understanding is clearly heavily influenced by the work of Bersu and - like his Isle of Man structures - her final interpretation can also be brought into question. Nevertheless, the Milton Loch excavations openly revealed the similarities between dryland and wetland circular architecture, a topic largely ignored since the work of Munro (Morrison 1985). Piggott's ability to deal with the real complexity of wetland archaeology was a skill which remained unparalleled in roundhouse studies until the recent work of Anne Crone (2000) at Buiston. Like Bersu, Piggott was ahead of her time. In 1953 she was already working towards an understanding of 'dwelling': marking the position of finds on her plans and considering ritual deposits. She also showed a rare understanding of settlement topography. The 1930s and 1940s had been a period of dramatic change in prehistoric archaeology and a new found confidence resulted in an excavation boom.

1.2.3 1950s-60s: Excavation and Classification

The second half of the 20th century saw a vast increase in the number of excavated circular structures (fig. 1.17). The practice of interior excavation and the targeting of structures was becoming more popular, inspired by the work of Bersu and Piggott. Also important at this time was the extensive work of the Royal Commission surveys. In the mid 1950s, a greater number of structures began to be excavated per site than was previously the case (fig. 1.17). Exceptionally good was the excavation of nine hut-circles at the EIA site of Bodrifty in Cornwall with its very clear plans (Dudley 1956). In the north, again we see most progress being made in the North Sea Region, particularly Northumberland; and in North Wales, especially in Gwynedd.

Worth noting is the work of W.E. Griffiths – who had excavated Llwyn-du Bach with Bersu - and A.H.A. Hogg on the enclosed sites of North Wales. Between them they excavated more than 20 structures on the sites of Bodafon Mountain on Anglesey (Griffiths 1955) and Conway Mountain; Cors-y-Gedol; Garn Boduan, Tre'r Ceiri; and Graeanog in Gwynedd (Griffiths & Hogg 1956; Griffiths 1959b; Hogg 1960; 1969a; 1969b). By the 1960s, the possibility of timber structures preceding the later hut-circles was recognised and excavation to natural was found to be necessary. Also worth mentioning is the work of Peter Gelling on the Isle of Man (cf. *Current Archaeology* 1971). Other important sites excavated in the 1950s and 1960s included Staple Howe in North Yorkshire (Brewster 1963), Dragonby in Lincolnshire (May 1996), and Garton-Wetwang in East Yorkshire (Brewster 1976). Excavations at the latter site began in 1963 and continued until 1980 but, as with Dragonby, delays in publication mean that the impact of this key site remains limited. Brewster's ideas on house reconstruction were, however,

influential – with the most accurate understanding of structural features since Piggott - and the report can be seen as a source of inspiration for the work of Peter Reynolds.

Following the work of Hawkes and Piggott, roundhouse studies were still heavily influenced by the invasionist principles of the 1930s-40s (cf. Alcock 1960; Feachem 1960-61). Kenneth Steer's (1956) excavations at West Plean in Stirling exposed an EIA house type overlying a house typical of the Bronze Age examples in Sussex (fig. 1.18). Steer saw this as reflecting:

"the peaceful transformation of a native Late Bronze Age site by the adoption of new architectural traditions imported into the region by Early Iron Age immigrants"

(Steer 1956, 249)

Regarding his Manx structures Bersu believed they must be the product of immigrants from southwest Scotland: as the design of such elaborate houses could not have evolved on so small an island (Bersu 1977, 89). As the number of excavations continued to increase, Hawkes (1961) put forward a reworking of the Invasion Theory to include a more regionally-based chronology. In an attempt to change the direction of theoretical discussion in Iron Age studies, F.R. Hodson (1964) included the roundhouse in his 'type fossils' of the British Iron Age. His aim was to shift the focus from invasionism to analysis based on the identification of cultures. His main assertion - as had been suggested by Maud Cunnington (1932) almost thirty years earlier - was that the Iron Age people of Britain were of indigenous ancestry and changes in material culture were not necessarily the product of continental immigration. He did this by emphasising the real difference between the continent and Britain as displayed in the insularity of certain British *type-fossils*, for example, the roundhouse. In 1966, S. Piggott's northward extension of Hawkes' cultural provinces made no mention of invasionism.

In the wake of Bersu, excavation of large structures became popular in the 1950s and 1960s, for example the 1956-60 excavation of what was interpreted as a 15 m structure at Longbridge Deverill Cow Down in Wiltshire (Chadwick 1961) and the 1960-63 excavation of another similar-sized structure at Pimperne in Dorset (Harding *at al.* 1993). Alongside this, Hodson's use of the term *Woodbury Culture* and the simplistic yet persistent idea that size equals status (e.g. Gardner & Savory 1964; Bewley 1994) had placed unwarranted emphasis on the *large* houses of prehistoric Britain. This preoccupation with larger structures continued at least until the 1970s (cf. Harding 1974) and has become ingrained in the public perception of prehistory through the work of Peter Reynolds. The first attempts at a typology of roundhouses were made - again in North Wales and the Tyne-Forth Province - in the mid 1960s. In 1964, Gardner & Savory attempted a national typology (table 1.1). The scheme is heavily influenced by the principles of evolutionary progress: that development through time is cumulative and that forms move from simple to complex to degenerate - as such the scheme is rather stylised.

Type	Date	Structural Features	Size
Dartmoor Glastonbury	BA	hut-circle	small (6 m)
Itford Hill Glenachen Rig	BA	post-built/stone-built; central post	small
Staple Howe LD Cow Down	EBA EIA	post-built/stone-built; supporting post-ring	larger
Little Woodbury	IA	concentric post-rings	large (14m)

Table 1.1 Gardner & Savory's (1964) classification

Richard Feachem

Following the work of Piggott and his own excavations - at the sites of Glenachen Rig, Harehope, and Green Knowe in the Scottish Borders (Feachem 1958-59; 1959-60; 1960-61) – and perhaps also in reaction to the work of Gardner & Savory, Richard Feachem (1965) created the first typology for the Tyne-Forth Province (table 1.2). The classification, despite being based on just a few type-sites - Green Knowe, Harchope, West Plean and West Brandon – has actually stood the test of time reasonably well. By the time of Hodson's (1964) pivotal paper, invasionism had been the dominant archaeological philosophy for over half a century. Having only reached roundhouse studies by the late 1940s, the same time lag meant that it was only gradually deposited. In some instances it managed to persist until the late 1970s (e.g. Frere 1974; Wilson 1978-80). Feachem's scheme begins with the Bronze Age *platform houses*, which he believed to be intrusive, and as the result of migration:

"the *unenclosed platform settlements* represent an immigration of people with a somewhat more rigorous and systematic method at their command than any which had existed before . . . the incomers might be equated with a possibly late stage of the movement which is recognised as having been directed from the Continent to the eastern seaboard of Britain in the middle of the first millennium BC"

(Feachem 1960-61, 85)

Type	Date	Structural Features	Size
<i>Platform Houses</i>	BA	post-ring on platform	12-15 m
<i>Simple-Ring</i>	EIA	post-ring; central post; external eaves-trench	6 m
<i>Ring-Groove</i>	IA	wattle & daub outer wall; supporting post-ring	max. 9 m
<i>Ring-Ditch</i>	IA	akin to ring-groove but with internal ditch	max. 12 m
<i>Advanced Design</i>	IA	wall-slot and/or concentric post-rings	12-15 m
<i>Stone-Walled</i>	RIA	stone-built	max. 9 m

Table 1.2 Feachem's (1965) classification

Feachem sees the EIA simple-ring house as a form of 'tent', the design of which is improved upon after immigrants from the south introduce the 'better' *ring-groove house*. Following Piggott, Feachem sees social change in the north as a 'reflection' of that in the south (Feachem 1958-59, fig. 6; 1965). As with most typologies of the time, the scheme also seems to follow the principles of evolutionary progress. After large structures at the end of the Bronze Age,

structure size falls off and then increases gradually throughout the Iron Age until the degenerate *houses of advanced design* give way again to smaller, RIA structures. Feachem continued his trend for works of synthesis. In 1966, publication of A.L.F. Rivet's *The Iron Age in Northern Britain* included his survey of Scottish hillforts. The same volume contained a synthesis of settlements in Northumberland by George Jobey.

George Jobey

The unparalleled contribution made to roundhouse studies by George Jobey (cf. Macinnes 1991) began in the late 1950s with his excavations at the sites of Gubeon Cottage; Huckhoe; Riding Wood, Bridge House and West Longlee in Northumberland (Jobey 1957; 1959; 1960). In the 1960s, he excavated West Brandon in Durham (Jobey 1962); Marden and Tynemouth Priory in Tyne & Wear (Jobey 1963; 1967); High Knowes and Burradon in Northumberland (Jobey & Tait 1966; Jobey 1970); and Burnswark Hill in Dumfries and Galloway (Jobey 1977-78). His excavations continued into the 1970s and 1980s (see below). Jobey's early excavations, like those of Griffiths & Hogg, tended to concentrate on hut-circle excavation. However Jobey was already open to the possibility of an early timber phase and at Huckhoe (Jobey 1959) we have the first comprehensive identification of RIA timber circular architecture. The report was thorough in both its discussion of the structures and of their use.

Jobey's 1960-1961 excavation of West Brandon - perhaps inspired by Kenneth Steer's (1955-56) Woodbury-style excavation at West Plean in Stirling (fig. 1.18) - marks a move towards a concentration on timber architecture. Despite the West Brandon structures being directly comparable to the Woodbury structures in size and construction techniques (fig. 1.19); clearly abreast with Hodson's (1964) work, Jobey resisted the temptation to follow Steer and Feachem, by seeing 'development' in north Britain as the result of southern immigrants. Instead he focuses on a detailed reading of the archaeological features. What we see represented in Jobey's work is the origins of a reaction against narrative. Following the excesses of a generation gripped by 'invasion neurosis' (Clark 1966), in the mid 1960s researchers - who were keen to prove the relevance of archaeology as an objective science - were reluctant to make the same mistakes again. Excavation techniques had improved enough to allow interpretation at the level of the site. At Marden, Jobey (1963) begins to consider use of space, both within the enclosure and within the circular structures.

In the report for High Knowes (Jobey & Tait 1966), Jobey discusses the *ring-ditch house*: its function for the stalling of cattle and also the fact that the *ring-ditch* and *ring-groove* were not successive construction types. In his consideration of High Knowes B, for the first time we have a statement that suggests continuity of settlement from the Bronze Age into the Iron Age in the

north. Inspired by his work at West Brandon, Jobey offered an alternative to Feachem's sequence for northern timber-built roundhouses (table 1.3). In it he dispensed with the topography- and typology-driven elements of the 1965 scheme and re-asserted Steer's (1956) main point: that simple post-ring structures were of Bronze Age date. In his Burnswark Hill report (Jobey 1977-78) he attempts to re-affirm his idea that post-built houses pre-date those of wall-slot construction. Unfortunately simple typological statements don't tend to agree with prehistoric architecture and Jobey's 'earlier' postholes are clearly seen to cut the apparently later wall-slots (fig. 1.20).

Type	Date	Structural Features	Size
small post-ring	BA	post-ring; central post	small (6 m)
large post-rings	EIA	post-ring; concentric supports	large (12-15 m)
ring-groove	IA	wall-slot; concentric supports	large (12-15 m)

Table 1.3 Jobey's (1966) classification

In 1966, ideas concerning the details of construction began to blossom with Joanna Close-Brooks' exact ethnographical recording of a circular shepherd's hut in Italy. Following this, Avery and Close-Brooks' (1969) reinterpretation of Shearplace Hill CS A Dorset suggested that - contrary to Jobey's classification - large houses had their roots firmly in the Bronze Age (Avery & Close-Brooks 1969): a fact which has proven to be true for most areas. Jobey's work at Burradon (Jobey 1970) did, however, move things forward again (fig. 1.21). Perhaps inspired by Leslie Alcock's 1966-70 open-area excavations at South Cadbury (Barrett *et al.* 2000); at Burradon, Jobey excavated an 80 m x 50 m trench (4000 m²), covering more than 50% of a double-ditched recti-linear enclosure, including the total area of occupation. The report is of very good quality. In it Jobey discusses both the site and its surroundings in a regional context. He talks about drainage, plough damage and the methods and problems of excavation. As at West Brandon, he also discusses fills and the formation of deposits. The 1950s and 1960s had been a period of increased excavation, with various attempts at making sense of an ever-growing dataset.

1.2.4 1970s-80s: Construction and Function

The work of George Jobey was to see real progress in roundhouse studies during the 1970s and 1980s, with the development of ideas on the construction and function of prehistoric structures alongside a continued increase in their excavation. In total, George Jobey had been responsible for the excavation of more than 130 circular structures on twenty-three different sites throughout north-east England and southern Scotland between 1955 and 1983. In the 1970s he concentrated most effort on his home county of Northumberland, excavating structures at the sites of Hartburn; Tower Knowe; Belling Law; Kennel Hall Knowe; Gowanburn River Camp; and Standrop Rigg (Jobey 1973a; 1973b; 1977; 1978; Jobey & Jobey 1988; Jobey 1983).

Moving once more into southern Scotland he excavated at Boonies in Dumfries & Galloway (Jobey 1972-74); and Green Knowe in the Scottish Borders (Jobey 1978-80). In the 1980s, again in Northumberland he excavated the sites of Doubstead; and Murton High Crag (Jobey 1982; Jobey & Jobey 1987).

Jobey's (1973a) excellent report for Hartburn (fig. 1.22) discusses several issues of survival, for example, the non-survival of stakeholes, plough damage on slopes and erosion in antiquity. He also discusses the problems of recognising and interpreting features and admits that his earlier suggestion regarding post-built and wall-slot houses (see above) is not necessarily a standard sequence. In the Hartburn report we see the origins of two main themes which he concentrates on throughout the 1970s: rebuild episodes and structure lifespans; and the progression from LrIA timber structures to RIA stone-walled structures. Jobey suggests that the Hartburn structures may indicate non-continuous, short-term occupation at intervals: a topic which has only recently come back into vogue (cf. Barber & Crone forthcoming; Halliday forthcoming).

In the 1970s, Jobey became increasingly interested in the relationship between native settlements and those of the Romano-British period. At Tower Knowe (Jobey 1973b), he begins to comment on the possibility that an increase in settlement population is represented in the number and size of successive sets of structures. Jobey also investigated unenclosed, Bronze Age structures at the sites of Green Knowe and Standrop Rigg (Jobey 1978-80; 1983). He tackled the issues of damage associated with afforestation, platform settlement, ring-banks, coppicing and agriculture and upland depopulation. Jobey's clear research aims and targetting of sites to answer these questions has left us with a high number of well-recorded, published sites.

Characteristic of all Jobey's reports is analysis of the site at structure, settlement, and landscape level. At the small-scale he treats the descriptions of features thoroughly, he integrates finds and any environmental data. He tries to elucidate the different phases of occupation and also considers the use of enclosure space. At a broader level he tries to integrate each site into a wider picture of regional settlement change. It is also clear that Jobey had a great deal of respect for the archaeology: he is unwilling to push the evidence, always demonstrating relationships fully, and alluding to the potentially different results that future excavation will bring. The Tyne-Forth Province had found a new figurehead in Jobey. Elsewhere, work in Highland Scotland had begun to flourish and sites like Kilphedir in Sutherland (Fairhurst & Taylor 1970-71) extended the interest of roundhouse studies into the highland zone.

However, the number of structures being excavated in north Wales had continued to fall (fig. 1.12). Nevertheless, very influential in roundhouse studies was the work of Chris Musson. In considering structures at the sites of Whitton and Llandegai in north Wales (Musson 1970b),

Musson - a trained architect turned archaeologist - became concerned with the engineering principles involved in the construction of circular structures. He outlined the structural systems able to cope with the lateral and radial stresses exerted by a conical roof (Musson 1970a). He also challenged Bersu's interpretation of Little Woodbury I's central quartet, believing it instead to be a granary structure of a different phase to those of the house. Moving away from the generalisation of the 1960s typologies and the 'unrealistic contrast' between the small, centre-posted Bronze Age houses and the larger multi-ring Iron Age houses; Musson stressed the real *variety* in structure size, methods of construction, and use of materials (Musson 1970a). Musson went on to conduct extensive investigations at the Breiddin in Powys resulting in an excellent report (Musson *et al.* 1991).

Peter Reynolds

Alongside a further growth in excavation (fig. 1.17), the 1970s also saw the development of functionalist thought within the subject. In roundhouse studies, the consideration of construction techniques gained popularity (e.g. Avery & Close-Brooks 1969; Guilbert 1975b; 1976). Following Bersu's assertion that reconstruction was the responsibility of the excavator, it was almost inevitable that experimental archaeology would take hold in roundhouse studies. The man most responsible for this move was Peter Reynolds. His aims were not to claim any form of historical accuracy but rather to prove the validity of current interpretation concerning roundhouse construction by building houses according to excavated evidence. To the best knowledge of the current author, Reynolds was personally responsible for the construction of no less than seventeen roundhouses whilst advising on many others. The first was his first *Glastonbury House* on Bredon Hill. The structure was just 4.3 m in diameter and the design clearly inspired by Brewster's (1963) Staple Howe report, which in turn followed Kilbride-Jones (1938). His first major undertaking – the 6 m stone-built first *Conderton House* – was built at the Avoncroft Museum in Worcestershire in 1969-70, where another structure was later undertaken but not completed (Reynolds forthcoming).

In the early 1970s, Reynolds set up his experimental Iron Age farm at Little Butser near Peterfield in Hampshire where at least seven constructs were built including the *Maiden Castle House* – completed in 1973 – a 6 m simple-ring, post-built structure with a central post and wattle and daub walls (Reynolds 1979). Between 1974-75, the larger, porched *Balksbury House* was built, again on a single post-ring. A hypothetical turf roofed and walled structure based on a central post collapsed after a number of months (*ibid*). None of these projects were as successful as his *Pimperne House*: his first large double-ring structure (fig 1.23) construction of which took place between 1976 and 1977 (Reynolds 1982; Harding *et al.* 1993). A 12.8 m stake-walled structure with supporting post-ring and porch (*ibid*), the house withstood an episode of

flooding and the hurricane of 1987 (*ibid*). With Reynolds' work, a new perspective had been gained on prehistoric architecture. The *Pimperne House* was dismantled ahead of time in 1990 (Harding *et al.* 1993). Prior to this, decay had been monitored and repair activity recorded with the results of the project well published.

Following Pimperne, Reynolds experimented with three stake-walled simple-rings using plans from Moel y Gaer and Dancbury. In the early 1990s, Reynolds built three constructions for the Museum of Welsh Life near Cardiff: a further *Conderton House* (fig. 1.24), and another two based on structures from Moel y Gaer and Moel y Gerddi (Reynolds forthcoming). After moving site in 1992 to Bascomb Copse in Hampshire, a further four roundhouses were constructed. Two were based on the c. 6 m diameter structures from the Glastonbury Lake Village (Roger Hedge pers. comm.). Reynolds largest construction was that based on Chadwick Hawkes' (1994) interpretation of the structure at Longbridge Deverill Cow Down: a double post-ring structure of 15 m diameter with wattle and daub walls. Reynolds' final house - sadly not completed before his untimely death - is based on the 9 m timber phase at Moel y Gerddi and was finished early in 2002 (Roger Hedge pers. comm.). By the time of his death, Peter Reynolds had constructed structures covering a full size range using a variety of construction techniques, with subtle differences in the materials used at each.

Graeme Guilbert

Dug between 1972-74, Graeme Guilbert's excavations at Moel y Gaer (fig. 1.25) exposed around 3600 m². This was more than 10% of a c. 2 hectare multi-vallate hilltop enclosure and was almost as large as the area excavated by Jobey at Burradon (c. 4000 m²). Having worked with Alcock and Chris Musson at South Cadbury - where stake-walled structures had been recognised for the first time - Guilbert went on to expose 37 stake-walled and post-built structures at Moel y Gaer (Guilbert 1975a; 1975b). In his work, Guilbert goes into an admirable level of detail regarding the structural details of both types of structure (1975b; 1976). The standardisation of forms led him to interpret the site as having an element of planning and his discussion of the standardised orientation of structures at Moel y Gaer (Guilbert 1975b) ultimately led to the birth of the ritualisation trend of the late 20th century (see below).

Guilbert's greatest contribution, however, was on the topic of archaeological survival, discussing both the effects of erosion and of plough damage on the remains of hilltop sites and those in the ploughzone (*ibid*). His assessment of the lack of stake-walled roundhouses in the record led to a suggested reconsideration of the evidence at Little Woodbury and a reinterpretation of Jobey's 'cavity-wall' structure at Huckhoe. His discussion also led to an assessment of evidence quality suggesting, after Musson, an optimum time of year for

excavation of settlement sites and the problems of interpretation on palimpsest sites. This led to the suggestion that in selecting a site for excavation, a non-complex, undamaged site might maximise the information that would be retrieved. Guilbert was also an advocate of open-area excavation:

"there is really no longer any viable alternative than to think in terms of total excavation if this particular branch of IA settlement studies is to progress"

(Guilbert 1975b, 220)

In 1981, inspired by his Moel y Gaer excavations and by the work of Chris Musson, Guilbert published his important paper on the effects of plough damage (Guilbert 1981). In it he offered the suggestion that some single-ring roundhouses, remaining archaeologically as a lone post-ring, were actually of double-ring construction. His suggestion was that the outer ring often escapes detection because of its ephemeral nature combined with the truncation of sites due to plough damage or the effects of erosion. He uses the unploughed Moel y Gaer data to illustrate his point and talks of the implications regarding the resulting increased size of late prehistoric roundhouses. In 1982 Guilbert identified what he termed *axial-line symmetry* in the double ring roundhouses of Moel y Gaer (fig. 1.26). This is the symmetrical placement of equally-distanced posts from a line projected from the entrance: a design process. The recognition of such a method revealed, as Guilbert put it, the *design-consciousness* of prehistoric builders (Guilbert 1982).

Regional Excavations

In 1980s Scotland, important excavations took place at the sites of Aldclune in Perthshire (Hingley *et al.* 1997); and Kilearnan Hill in Sutherland (McIntyre 1998). The thorough work of Jim Rideout consisted of excavations at the Dunion (Scottish Borders), Carn Dubh (Perthshire), and Bannockburn in Stirling (Rideout 1992; 1995; 1996). Dennis Harding's (1982) *Later Prehistoric. Settlement in South-east Scotland* contained interim publication of several important late 1970s to early 1980s excavations, including St. Germans, Dryburn Bridge and Broxmouth in East Lothian, as well as the Dod in the Scottish Borders. The number of structures excavated in Highland Scotland was also on the increase. In the late 1970s particularly notable are the excavations at the Bronze Age structures of Cùl a'Bhaile in Argyll (fig. 1.27); and on Arran with the work of John Barber (1997) at Kilpatrick and Tormore; as well as the excavations at EIA Douglasmuir in Angus (Kendrick 1982; 1995).

Alongside the work of Jobey to the north, several influential sites were excavated in the 1970s to the south of the Tyne, for example, the work of K.J. Fairless and Dennis Coggins in Durham, at the settlements at Forcegarth Pasture (Fairless & Coggins 1980; 1986) and at Bracken Rigg

(Coggins & Fairless 1984). In the 1980s, the work of Dave Heslop at Thorpe Thewles in Cleveland (Heslop 1987) and of Colin Haselgrove at Coxhoe in Durham (Haselgrove & Allon 1982) also continued the trend for good quality excavation, recording, and reasonably rapid publication. Alongside the continuing excavations at Garton-Wetwang in East Yorkshire the number of excavated sites in the rest of Yorkshire continued to grow steadily. In the 1970s the important site of Dalton Parlours (West Yorkshire) was excavated (Sumpter 1988; Wrathmell & Nicholson 1990); and in North Yorkshire the late 1970s and 1980s saw excavation at the equally valuable sites of Roxby (Inman *et al.* 1985); Lingcroft Farm (Jones 1988); the Tofts, Stanwick (Haselgrove *et al.* 1989; 1990); and Rock Castle (Fitts *et al.* 1994).

In North Wales, the 1970s saw the excavation of the RIA homestead at Cefn Graeanog in Gwynedd (Goodburn 1978). Also in Gwynedd, beginning in 1979 Peter Crew undertook excavation throughout the 1980s of the LrIA structures of Bryn y Castell (Crew 1983; 1984; 1985); and Crawcwellt West (Crew 1989a; 1989b) (fig. 1.28) – with work continuing at the latter site until the late 1990s (Crew 1991; 1998). The early 1980s, saw the extensive interior excavation (c. 4800 m²) of Collfryn in Powys, revealing twelve circular structures (Britnell 1982; Britnell *et al.* 1989). Only in the Midlands Plain did the number of excavations remain consistently low (fig. 1.12). Despite this, a series of excavations were carried out in the 1970s by H. Miles and Chris Smith at Fisherwick in Staffordshire (Miles 1968-9; Smith 1974-5; 1979) and in the 1980s by Patrick Clay at the important site of Enderby I in Leicestershire (Clay 1992).

Further south, excavations at Little Waltham in Essex - followed by full and reasonably rapid publication (Drury 1978) - comprehensively addressed the topic of structural integrity with clear reconstruction drawings. This was followed in 1982 by Drury's edited volume *Structural Construction* which remains a key text for any researcher of archaeological architecture. The 1980s also saw publication of the site of Winnall Down in Hampshire (Fasham 1985) where structures are again treated as artefacts receiving full description and discussion. Perhaps most impressive, however, was the work of Barry Cunliffe at Danebury in Hampshire. The hillfort was excavated throughout the 1970s and 1980s; an area totalling something in the region of two hectares – almost half of the interior - was uncovered (Cunliffe & Poole 1991, fig. 1.2) and more than seventy circular structures identified (Cunliffe 1984; Cunliffe & Poole 1991).

From the mid 1970s, the time was right for a synthesis on the state of current knowledge regarding the roundhouse. Three works stand out. Barry Cunliffe's (1974) *Iron Age Communities in Britain* discusses the structures from a number of type-sites in both southern and northern Britain. Cunliffe explores the variety of construction types and design features, as well as touching on structure function and use of space (Cunliffe 1974, 176; 226). Dennis Harding's (1974) *The Iron Age in Lowland Britain* devotes a whole chapter to houses but tends

to concentrate on the large EIA structures of Wessex and the Tyne-Forth Province. His synthesis is valuable in that it puts British houses in their European context in an attempt to move away from Hodson's (1964) exaggerated ideas of British insularity. The third work is that of Colin Burgess (1980), his *Age of Stonehenge* bringing together evidence for Bronze Age houses for the first time.

In the late 1970s and 1980s the move was towards gaining an understanding of structure function and of interpreting social systems. This was seen first and nowhere more explicitly than in D.L. Clarke's 1972 paper: *A Provisional Model of an Iron Age Society and its Settlement System*. The paper was an attempt to use the wealth of information from the 90 wetland structures at Glastonbury to gain an idea of prehistoric social forms. In order to achieve this he applied various 'experimental models' to the evidence, including those regarding structural considerations; social and economic factors; settlement location; and models of settlement hierarchy (Clarke 1972, 801). He defined a number of settlement units and used the artefacts to determine structure function. Unfortunately, his work is seriously undermined by his use of formal analogy from both classical and medieval texts, and ethnography. His work also relies heavily on modern androcentric principles of female dependency and male supremacy. The work has recently received extensive criticism (Coles & Minnitt 1995; Barrett 1987) For roundhouse studies, however, the move towards understanding structure function – although flawed - was welcome.

Peter Hill

As a result of Harding's influential 1982 publication, Scotland became a centre for progress in roundhouse studies. Having excavated the site of Broxmouth in East Lothian between 1977-1978 (Hill 1982a; 1982b), Peter Hill began to consider the circular structure in more detail. In 1982 he provided a critique of Feachem's 1965 typological classification pointing out that comparison between different criteria - such as structural types, construction materials and design features – was not useful. Instead, he suggested the need for a new, more consistent classification based as much on structure use as on construction techniques or design features (Hill 1982c). In the article he suggests that we begin to assess the northern evidence without reference to Wessex which produces 'irrelevant contrasts and inadequate comparisons' (*ibid*, 31). Aware of the problems of dating and limited evidence, he begins to discuss the potential for recognising distinctly regional house *types*. He identifies two main types: the stone-built *votadinian house* – a 1st/2nd century AD tradition of the Tyne-Forth Province - and the apparently mid 1st millennium BC *ring-ditch house* of south-east Scotland (Hill 1982a). This work is fundamental to roundhouse studies but has remained undeveloped due to a lack of synthesised work in the subject.

In 1982, Diana Reynolds (now Murray) had provided an illustrative reconstruction of a 'ring-ditch' house and discussed the evidence for the type having had a byre function. Reynolds also introduced the idea of a second floor in these structures (fig. 1.29). In 1984 - inspired by Guilbert's recognition of axial symmetry - Hill investigated the possibility of a geometric relationship between the outer wall and post-ring in double-ring structures. He calculated an equation for the optimum positioning of roof supports which would provide maximum stability through even distribution of roof weight between the outer wall and post-ring and a general adherence to optimum was revealed in the archaeological evidence. Malcolm Reid (1989) suggested that Hill's (1984) interpretation would benefit from a less functionalist reading and introduced the idea that use of space may also have influenced construction. Structure function was already beginning to be thought about alongside construction.

The idea of circular structures as byres was gaining ground elsewhere, particularly in the work of Francis Pryor and R.S. Kelly. Francis Pryor's excavation of the Cat's Water site at Fengate, Peterborough (1984) involved the excavation of around 40 circular structures. For the first time, excavation included the analysis of soil phosphate levels as a way of gaining an understanding of the use of structures in farming practices. High levels were, naturally, found within the main area of settlement but with different levels in different structures. Four years later, R.S. Kelly published a more intensive study of soil phosphorus levels at Moel y Gerddi and Erw-wen in Gwynedd. The study was pitched at the level of the structure rather than the settlement and revealed higher phosphorous levels at the periphery with low values towards the centre - suggestive of cleaning activities and peripheral animal stalling (Kelly 1988a, 115-17).

With the advent of open area excavation and rescue archaeology, the 1970s and 1980s had seen a huge increase in the number of structures being excavated. Alongside this there was an increase in excavation quality and the greater use of scientific techniques such as C-14 dating and the analysis of soil phosphorous levels. With the work of George Jobey, Chris Musson, Peter Reynolds, Graeme Guilbert and Peter Hill, roundhouse studies had become an established field of study. The field had so far concentrated on construction methods and structure function but was edging towards the use of space. It is this topic which was to be studied in the 1990s and which ultimately led to the ritualisation of the subject.

1.2.5 1990s: Ritualisation

Young researchers had become dissatisfied with the current state of archaeological research with its emphasis on modern functionalist assumptions and as a result turned to the fields of social anthropology, ethnography and social theory in an attempt to find out more about human societies. Researchers were particularly influenced by the work of Pierre Bourdieu and Lévi-Strauss. As a result, roundhouse studies saw a move towards structuralism with the introduction of binary oppositions - often centred on androcentric assumption - and an increased reliance on ethnographic analogy. The obvious vehicle for these theories was the use of space. In an attempt to gain an understanding of spatial order and social forms, Sally Foster (1989) applied the technique of access analysis to monumental architectural forms from Highland Scotland. She concluded that the method enabled her to see the transfer of power from a local to a distant source over time. In 1990, Richard Hingley saw the roundhouse as consisting of a public activity-based centre and a private periphery for storage. In 1994, Mike Parker Pearson and Colin Richards' volume *Architecture and Order* brought together interdisciplinary approaches to social space.

In roundhouse studies, attention turned to the orientation data. Al Oswald (1991; 1997) - in his undergraduate thesis - concluded that roundhouse orientation was related to ritual beliefs and suggested the possibility of Iron Age sun worship (fig. 1.30). Andrew Fitzpatrick (1994) cited two Early Iron Age round-houses in Wessex as revealing evidence of a left-right division of space in the round-house which he linked to structure orientation (fig. 1.31). In 1996, a link was developed between Oswald's orientation, Fitzpatrick's division of activities and the movement of the sun; of time; and of people, around the house (Parker Pearson & Richards 1994b; Parker Pearson 1996; Fitzpatrick 1997). This was the beginnings of what has become known as the *Cosmological Model*, supported by formal ethnographic analogy and by the 'guiding' nature of entrance kerbs at two wheelhouses in north-west Scotland (Parker Pearson 1999). Based on this evidence, Parker Pearson concluded that sun-based traditions, centred on the roundhouse, had influenced prehistoric activity across Britain for the best part of a millennium (*ibid*, 60).

The most comprehensive study of the roundhouse to date was published in 1993 with Malcolm Reid's *Prehistoric. Houses in Britain*. With an increase in interest in prehistoric domestic life, the roundhouse became a topic for increased discussion. Bob Bewley's (1994) *Book of Prehistoric. Settlements* talks about the roundhouse, its form and function, at length; and Ian Armit's (1997) *Celtic. Scotland* devotes a chapter to 'house and home' in which he discusses the various forms of the roundhouse throughout Scotland. Arguably some of the most important work that has been conducted recently is that of Rod McCullagh & Richard Tipping (1998) at the site of Lairg in Highland Scotland. Important too was the work of Colin Haselgrove and Rod

McCullagh at Port Seton in East Lothian (Haselgrove & McCullagh 2000). The continued work of Peter Crew at Crawcwellt West in Gwynedd (Crew 1991; 1998) also deserves mention.

Much progress has been made recently in the Midland Plain and in south-west Scotland (fig. 1.12). High quality excavation at the sites of Enderby II (Sharman & Clay 1991; Meek 1997) and Wanlip in Leicestershire (Beamish 1998); have greatly increased the information available for that region. Large-scale excavations at Coton Park in Warwickshire (Chapman 1998) have also helped to increase the number of excavated structures. In south-west Scotland, the again high quality work of Jon Terry at the sites of Bodsberry Hill (South Lanarkshire); Uppercleugh (Dumfries & Galloway); and Lintshie Gutter in Lanarkshire (Terry 1993a; 1993b; 1995a); has helped advance work in the region. Alongside this the large-scale excavations at the site of Woodend Farm in Dumfries & Galloway (Banks 1995), has also increased the number of structures known for that region.

Increasingly scientific excavation and recording techniques mean that publication is increasingly delayed because of time devoted to the post-excavation process. The 1990s saw the release of a number of sites that had been held up in the publication backlog. Several major sites were published including Varley's 1930s excavations at Old Oswestry in Shropshire (Hughes 1994); and Longbridge Deverill Cow Down (Wiltshire) which had been excavated in the late 1950s (Chadwick Hawkes 1994). Publication of sites excavated in the early 1960s included the Dunion in the Scottish Borders (Rideout 1992); and Pimperne in Dorset (Harding *et al.* 1993). The publication of those excavated in the late 1960s and early 1970s included the Breiddin in Powys (Musson 1991); and Dragonby in Lincolnshire (May 1996). Also available were the results of the Danebury excavations (Cunliffe & Poole 1991) and the re-analysis of Bulleid & Gray's work at Glastonbury (Coles & Minnitt 1995).

The full publishing of the Pimperne experiment came out in 1993 meaning that only recently has the real value of Reynold's work been acknowledged. Experimental construction, often viewed as a heritage venture, continues to remain an undervalued academic resource. Since the pioneering work of Reynolds, numerous constructions have been built across the country. Most useful, however, has been the work of Jacqui Wood (1995) at her experimental Bronze Age site near Truro in Cornwall and of Hilary Murray (forthcoming) both of whom tested some of Reynold's assertions in print. Useful too has been the work undertaken at Castell Henllys (Mytum 1986; Bennett 2001; forthcoming). The 1990s again saw a vast increase in the amount of data available on the prehistoric house – both archaeological and experimental. Alongside this came the acceptance of the value of theoretical and interdisciplinary approaches in roundhouse studies. It is a *combination* of these factors – data, experiment, theory and the interdisciplinary approach – that is currently of interest in the field.

1.3 Current Trends

In the 1990s, rather than using new findings in social anthropology to gain an understanding of the complex workings of human societies; researchers instead used structuralist principles and formal ethnographic analogy to create a static model of the prehistoric use of space. This approach – already out of date at the time elsewhere in the social sciences – has unfortunately proved popular and younger researchers have had to spend much time deconstructing these powerful, yet largely constructed, narratives of prehistoric life. Following deconstruction, the trend is now towards using an increasingly interdisciplinary approach - combining social theory, social anthropology, ethnography - to solid archaeological datasets in the move towards an integrated social archaeology. Criticising the excesses of the post-processualist movement, the work of Jo Brück (1999a), for example, heralds the move towards a more sophisticated understanding of prehistoric human action in the domestic sphere. The work of Fokke Gerritsen (2001) has also revealed the potential for marrying local-level interpretation regarding human action with long-term regional processes of change.

Leading up to this has been the recognition of the importance of gaining an understanding of everyday life in prehistory. One method has been the attempt to recognise the annual routines of the agricultural cycle (Giles & Parker Pearson 1999; Parker Pearson & Sharples 1999; Cunliffe 2000). Another has been a move towards the greater integration of artefacts analysis (Hunter forthcoming). Interesting ideas are also coming forward regarding the possibility of the short-term duration of structures and the potential for recognising the seasonality of settlement (Barber & Crone forthcoming; Halliday forthcoming). There is also a trend towards integrated regional studies, for example the work of Tom Moore in Gloucestershire (Moore forthcoming). Alongside this, we find ourselves with a wealth of information which is in desperate need of broad works of synthesis (Haselgrove *et al.* 2001). In the field, further interesting work is being conducted at Cladh Hallan on South Uist (Marshall *et al.* 1999) and at Crick in Northamptonshire (Ann Woodward forthcoming) where research questions are being used to tailor the excavation strategy.

1.4 Research Aims

This research has two main aims: to produce the first fully comprehensive study on the character and roles of the roundhouse and, by doing this, to gain an understanding of everyday life in prehistory and how that varies across space and through time. By taking north and central Britain as its study area the thesis serves to help correct the imbalance that has developed in prehistoric studies, which sees south central England as a model for the rest of Britain. The

research also aims to address the recent theoretical trend towards the 'ritualisation' of the domestic sphere via the application of structuralist models. The thesis instead argues for an informed social archaeology: the study of human action in the past where the individual and the community make decisions - tailored both by the natural environment and an existing human environment – which in turn make up the structures of the wider social system. The thesis also hopes to encourage a return to the use of large datasets in prehistoric studies.

Alongside the more general nature of the analysis, the data is discussed at a number of different scales: namely household, landscape, community, region, and supra-region, as well as the provision of a narrative of prehistoric social change. The aim is to help bridge the gap between field and academia with the production of a piece of work that is relevant at both local- and national-level. The research, whilst academic, aims at being approachable and the structure of the thesis was deliberately aimed at producing a piece of work that could be published rapidly and which could be easily understood by non-specialists. The idea is to shorten the timelag between research and the uptake of new ideas in the field. In line with new research strategies regarding the targeting of work to those regional and chronological gaps in our knowledge (cf. English Heritage 2000a; Haselgrove *et al.* 2001) it is hoped that this research will help to highlight those areas which would benefit from further excavation, publishing and synthesis.

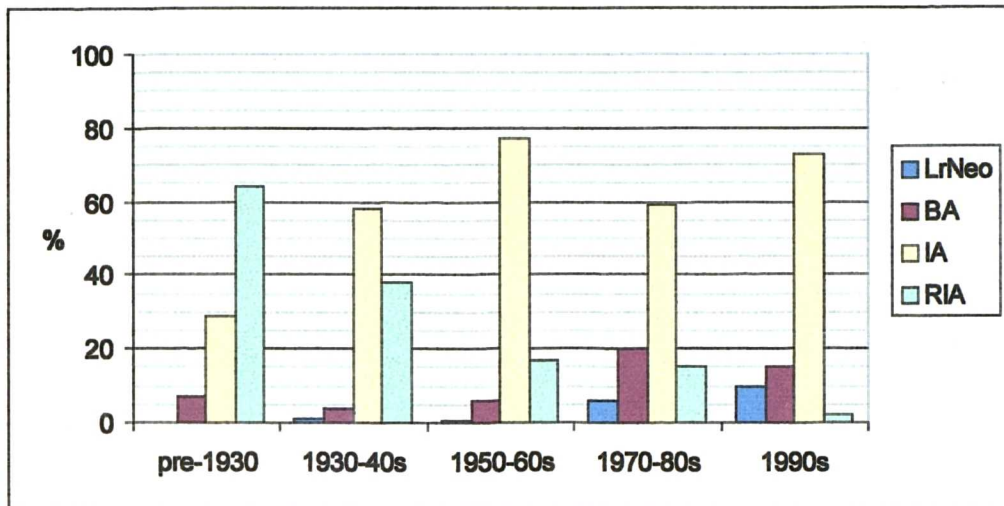


Fig 1.1 Excavated, published circular structures 1860-1999



Fig 1.2 George Tate (1805-1870) the first archaeological excavator of circular structures in north and central Britain (Source: Middlemas 1869-72)

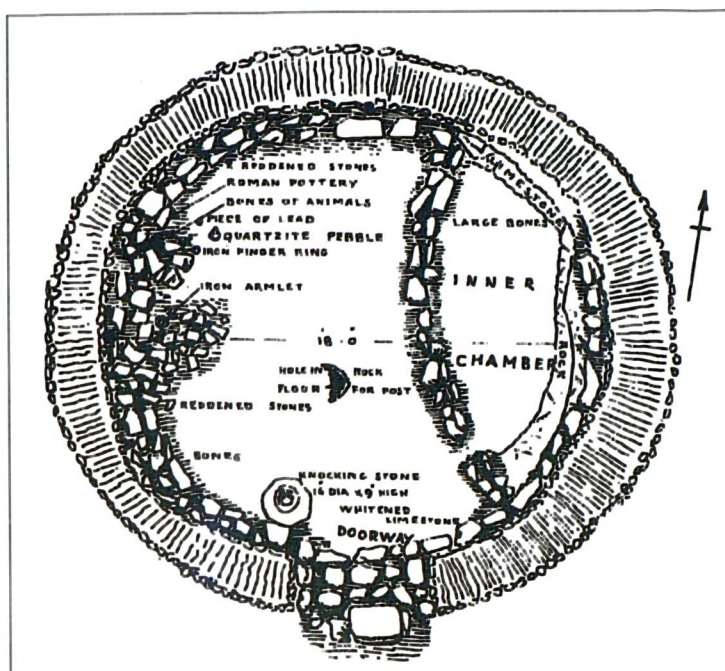


Fig 1.3 Hut Circle I at West Gunnar Peak (Northumberland)
(Source: Rome Hall 1884)

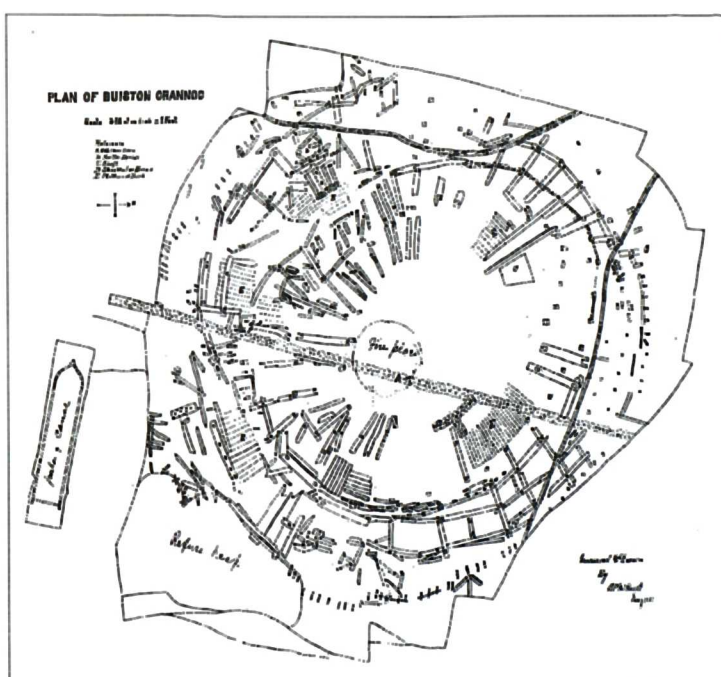


Fig 1.4 Plan of the Buiston Crannog excavation
(Source: Munro 1882)

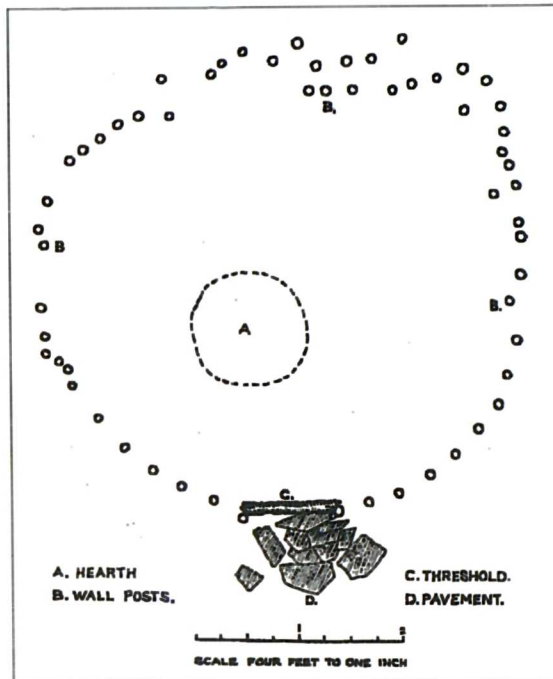


Fig 1.5 A wetland structure from Glastonbury
(Source Bulleid 1894)

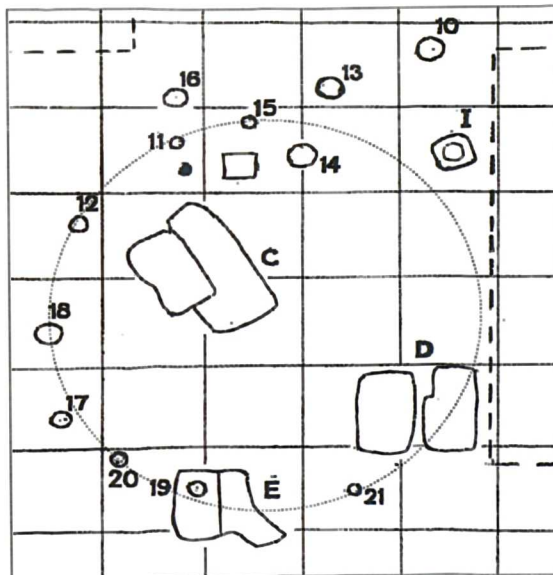


Fig 1.6 The remains of a structure at EIA All
Cannings Cross (Source: Cunnington 1923)

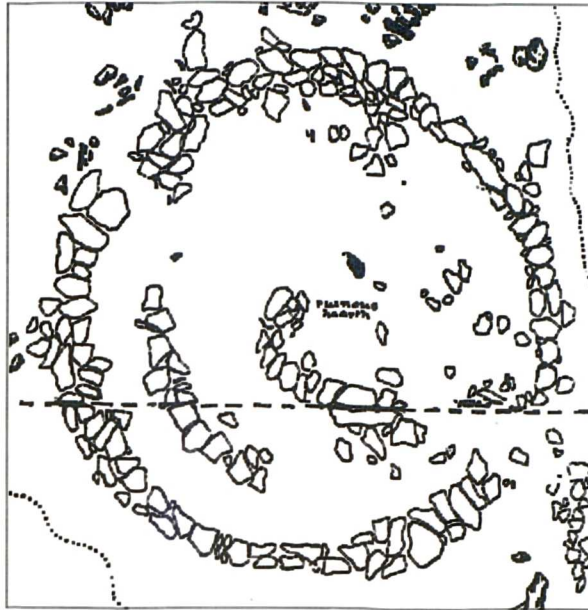


Fig 1.7 Foundations of a turf walled structure at Traprain Law (Source: Cree 1922-23)

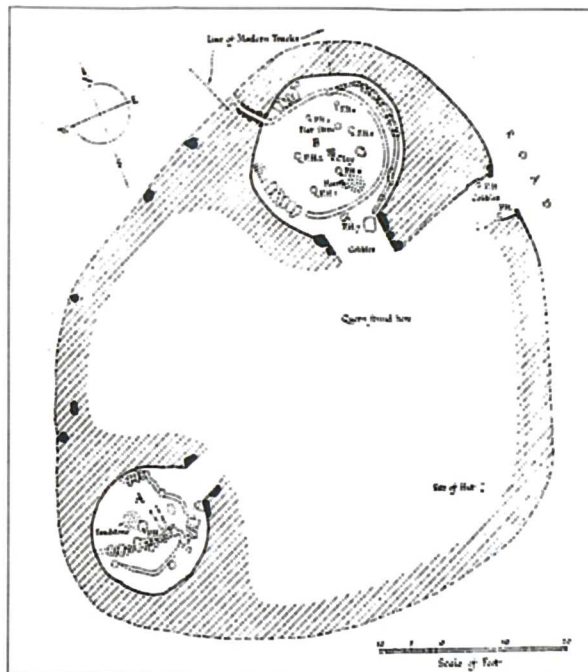


Fig 1.8 Internal postholes at RIA Caerau I (Source: O'Neil 1936)

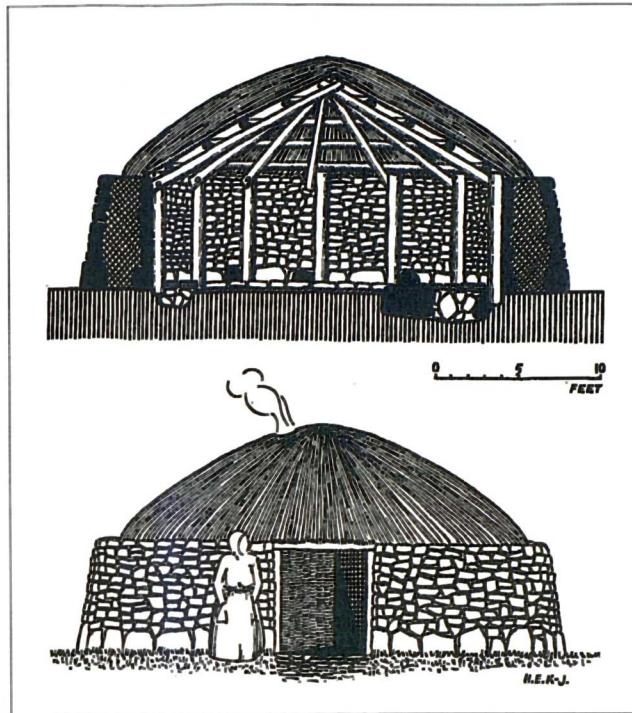


Fig 1.9 The first reconstruction of a prehistoric circular structure: RIA Milking Gap (Source: Kilbride-Jones 1938)

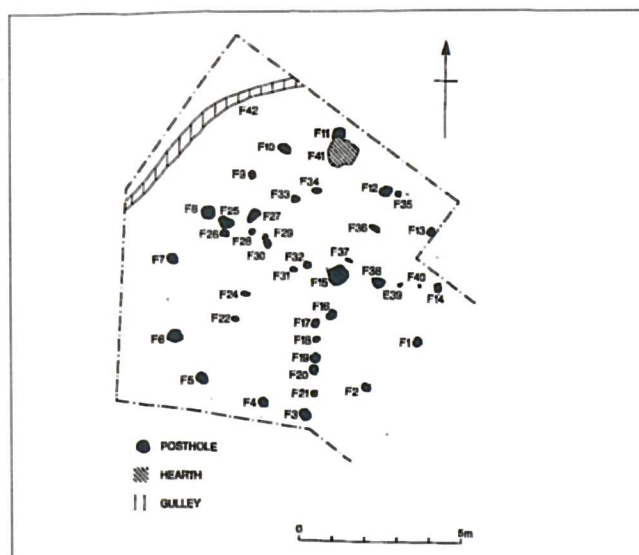


Fig 1.10 An early double-ring structure at Old Oswestry (Source: Hughes 1994)



Fig 1.11 Early open-area excavation at Voorberg, Netherlands in 1908
(Source: Verhart 2001)

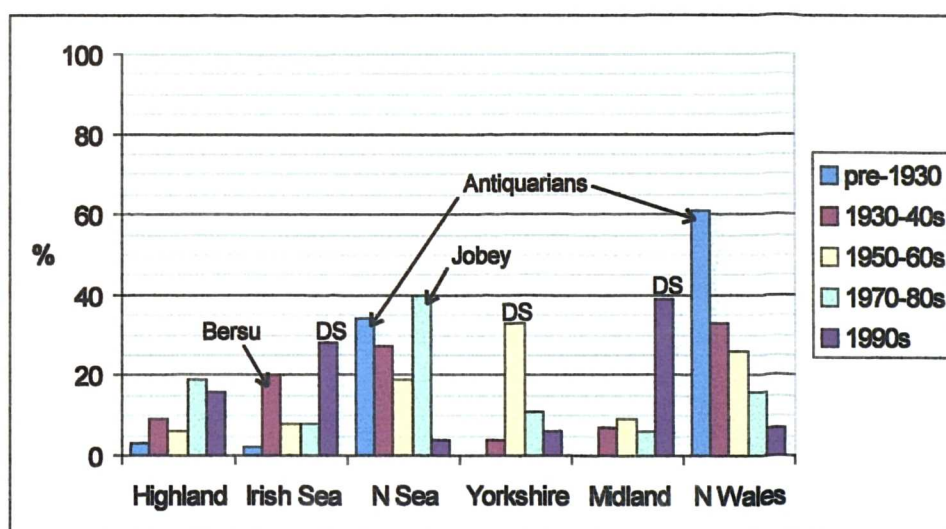


Fig 1.12 Trends in the excavation/publication of circular structures
(DS = distorter site)

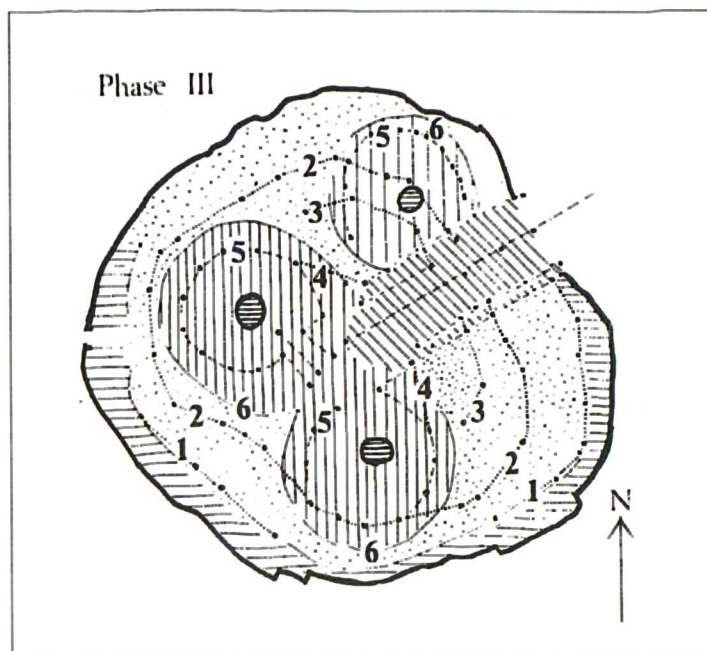


Fig 1.13 Bersu's (1977) interpretation of LrIA Ballacagen Lough A Ph. III as a massive structure

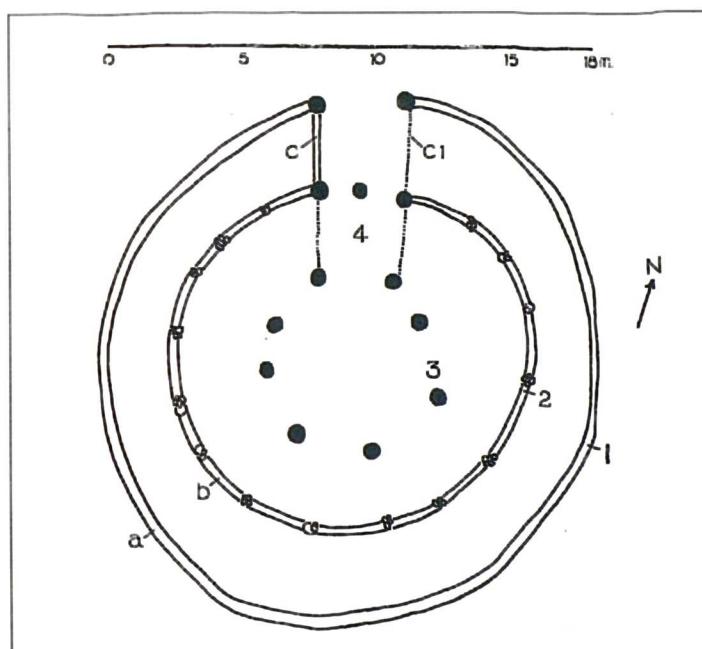


Fig 1.14 Phase I of the Iron Age structure at Scotstarvit Covert (Source: Bersu 1947-48a)

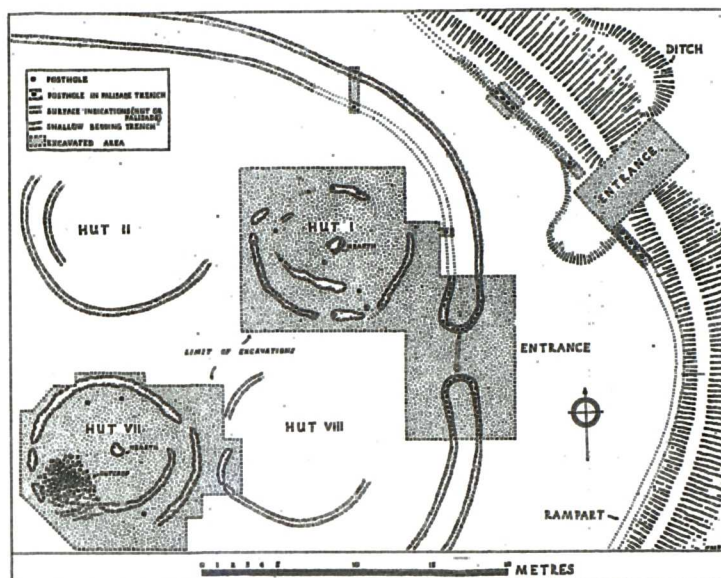


Fig 1.15 Excavation at Hayhope Knowe (Piggott 1948-49)

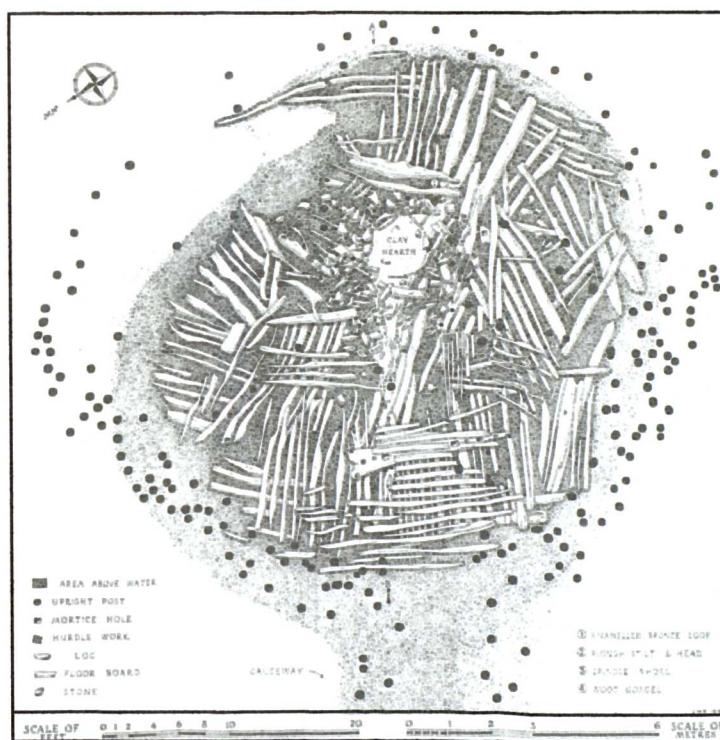


Fig 1.16 Milton Loch Crannog (Piggott 1952-53)

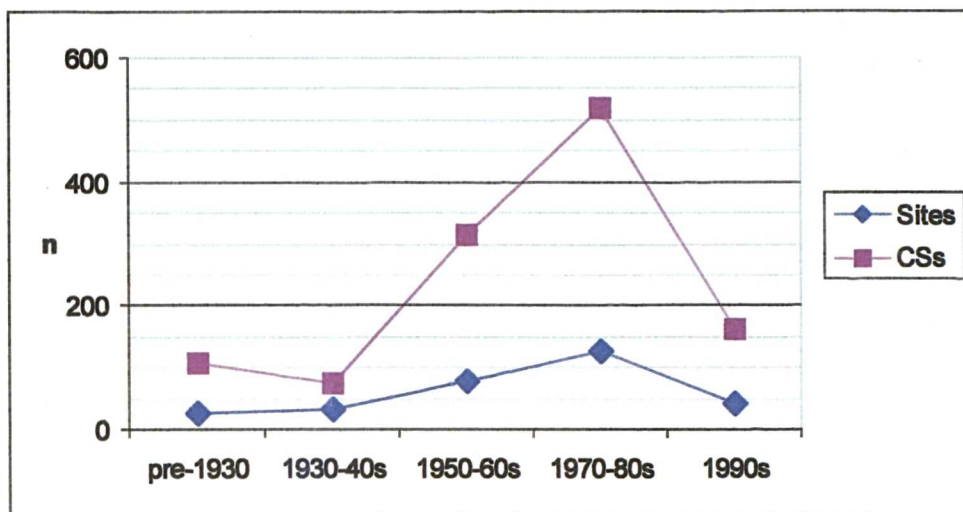


Fig 1.17 The excavation boom of the later 20th century

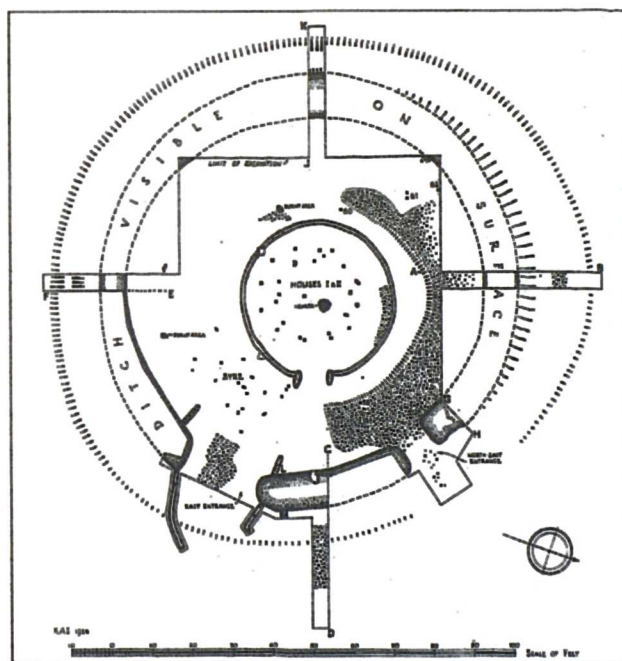


Fig 1.18 Steer's Woodbury-style excavation of West Plein (Source: Steer 1955-56)

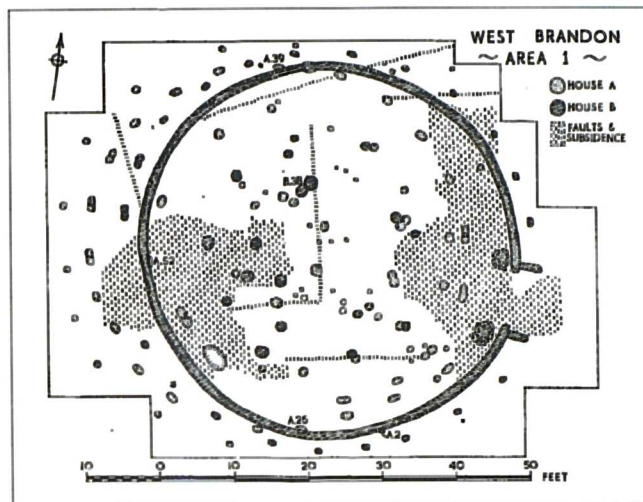


Fig 1.19 LrIA structures at West Brandon (Jobey 1962)

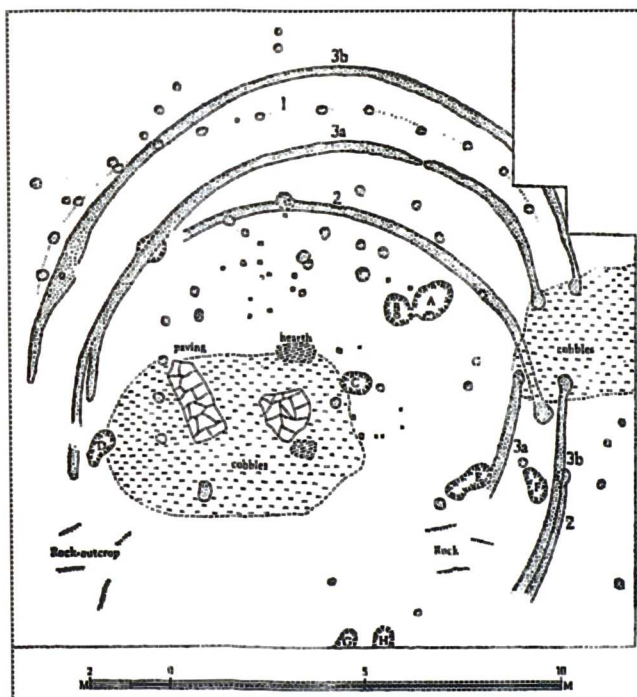


Fig 1.20 RIA Burnswark Hill (Jobey 1977-78)

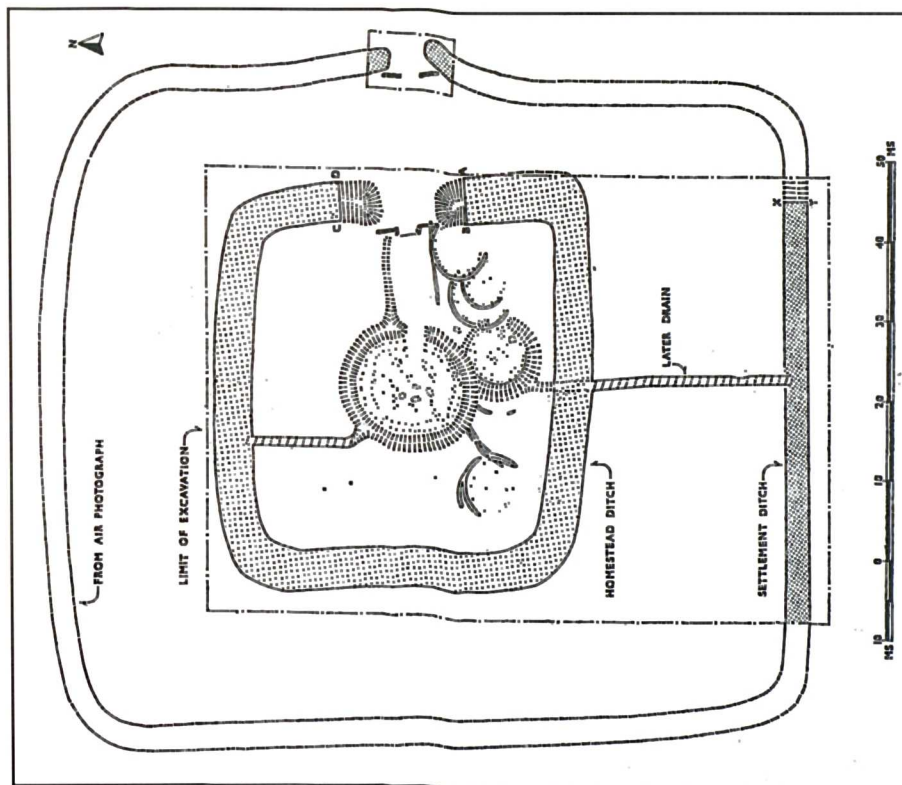


Fig 1.21 Large-scale interior excavation at Burradon (Jobey 1970)

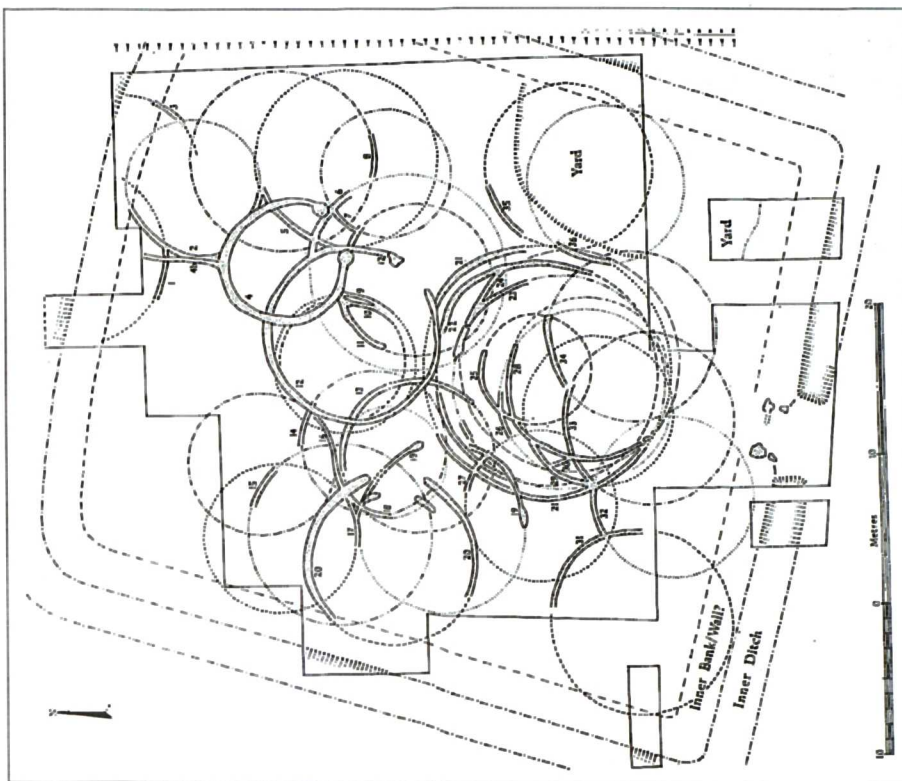


Fig 1.22 The multi-phase site at Hartburn (Jobey 1973a)

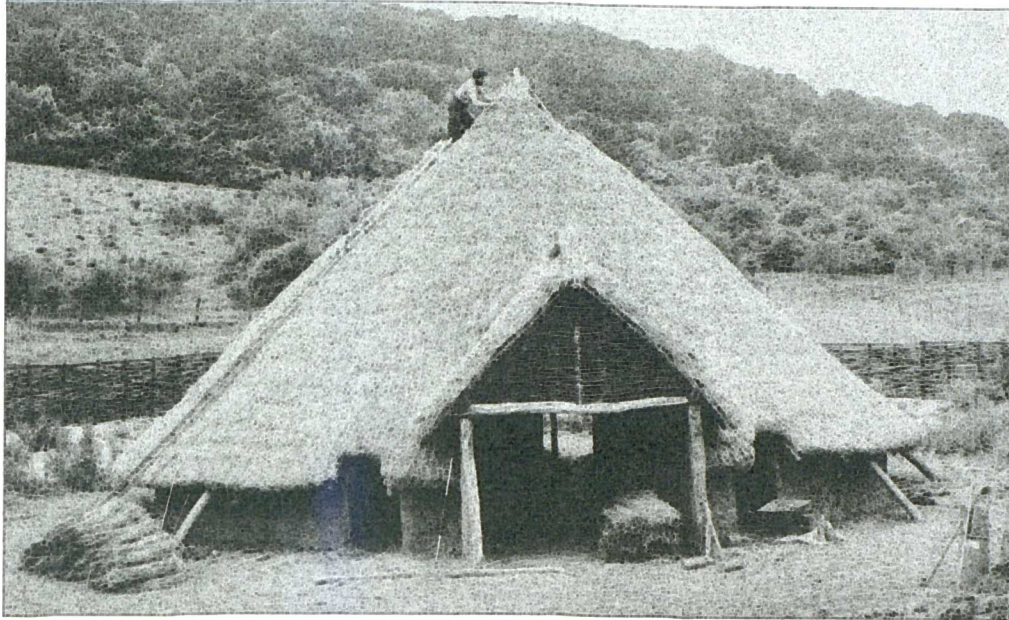


Fig 1.23 The *Pimperne House* (Harding *et al* 1993)



Fig 1.24 Reynolds' second *Conderton House* (Reynolds forthcoming)

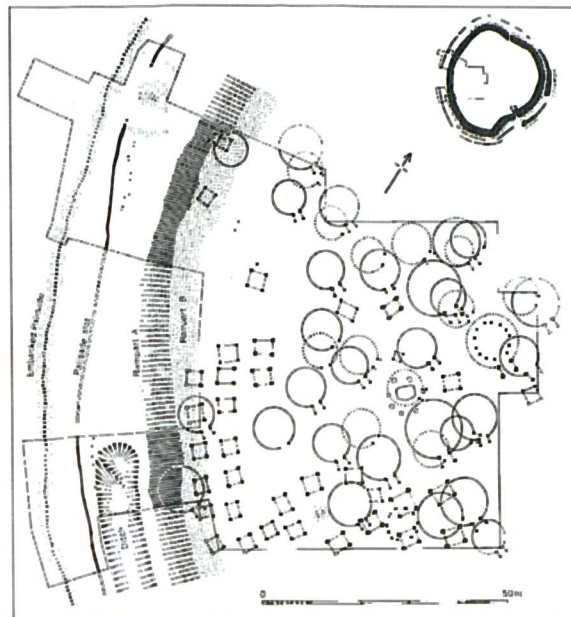


Fig 1.25 Large-scale excavation at Moel y Gaer (Guilbert 1982)

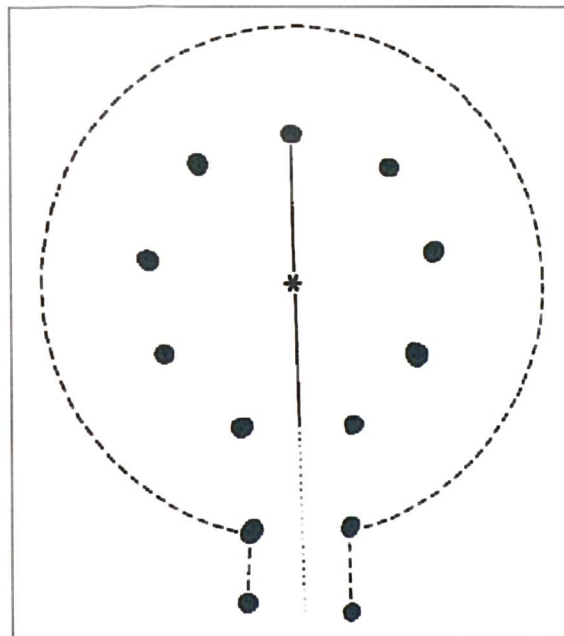


Fig 1.26 Axial line symmetry at Moel y Gaer (Guilbert 1982)

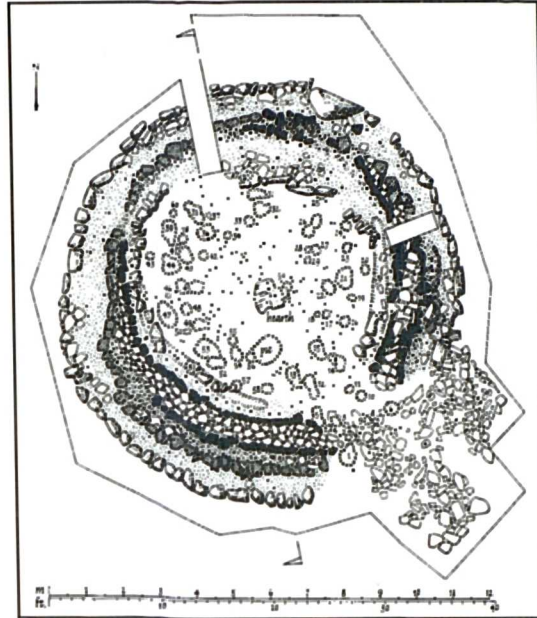


Fig 1.27 The BA hut-circle site of Cùl a' Bhaile (Stevenson 1984)

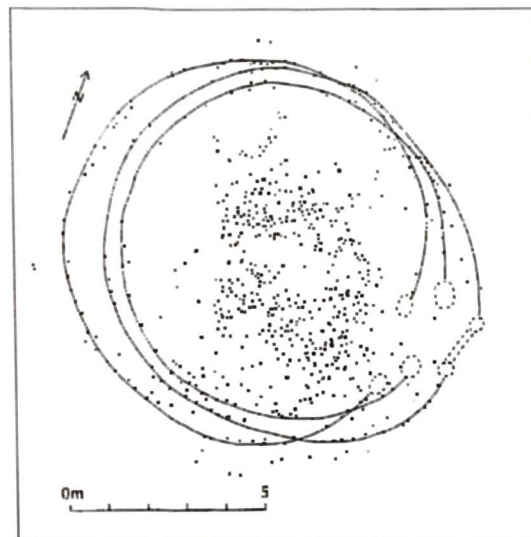


Fig 1.28 Stake-walled structures at Crawcwellt West (Crew 1989)

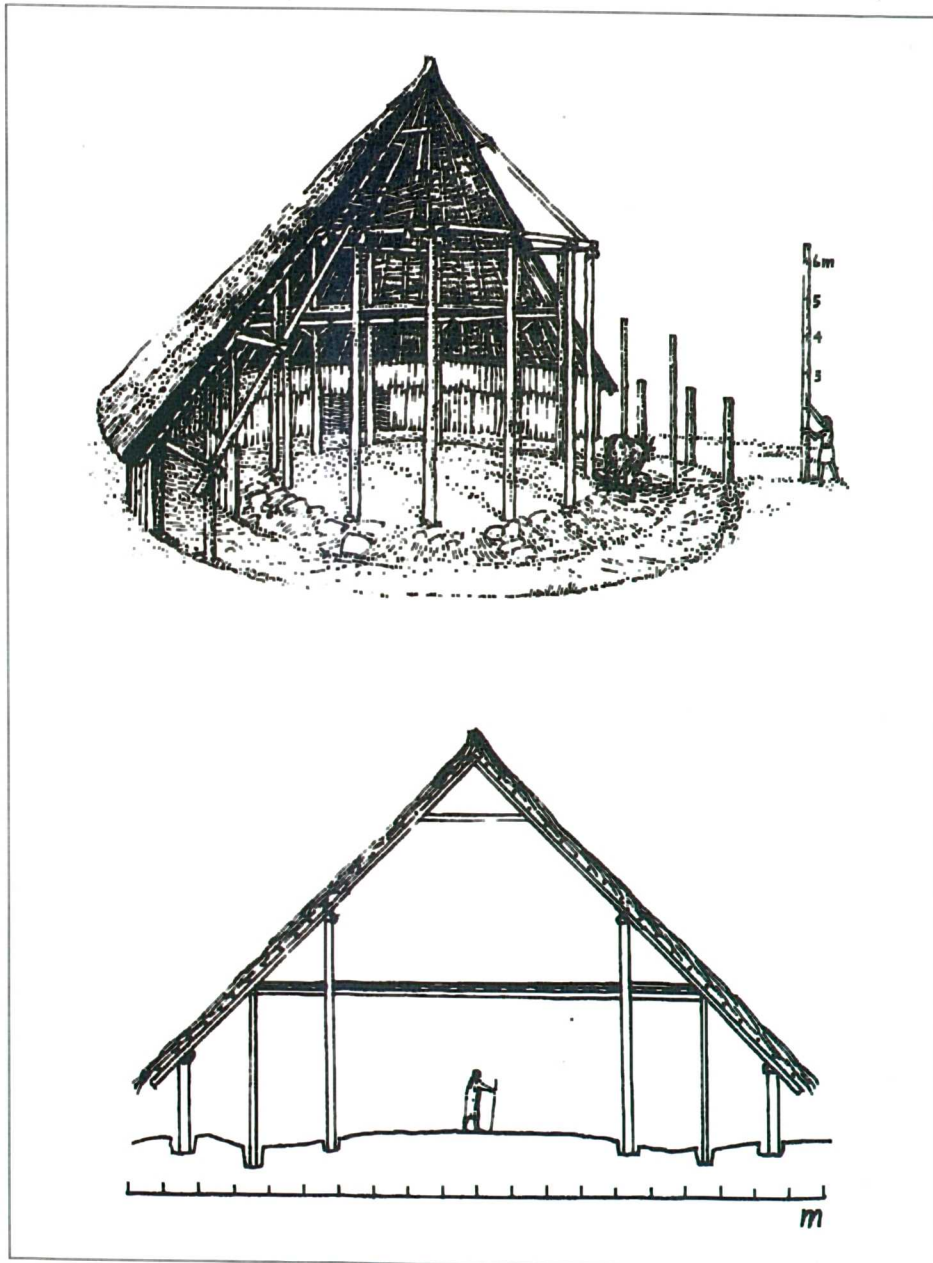


Fig 1.29 Reconstruction of the ring-ditch house (D. Reynolds 1982)

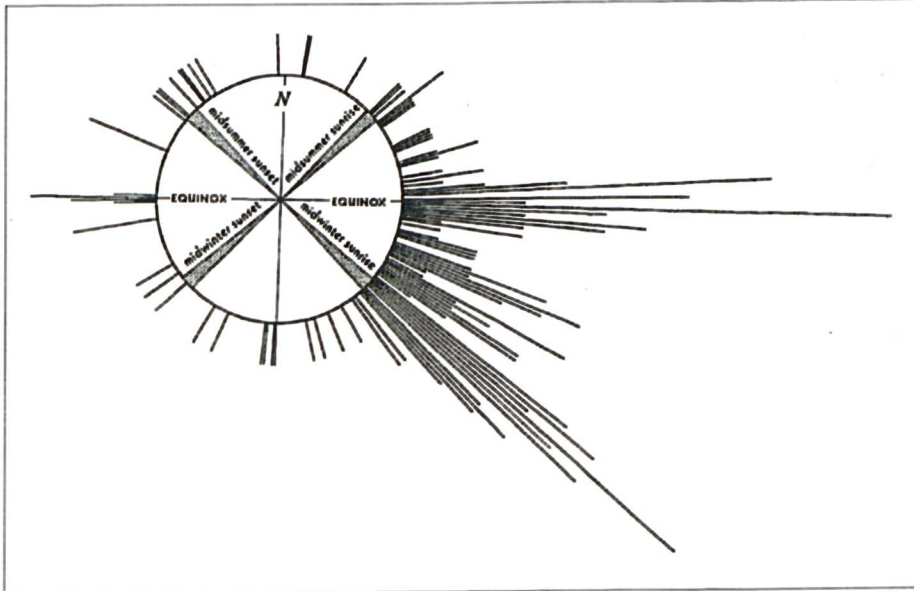


Fig 1.30 Oswald's (1997) graph of standardised orientation

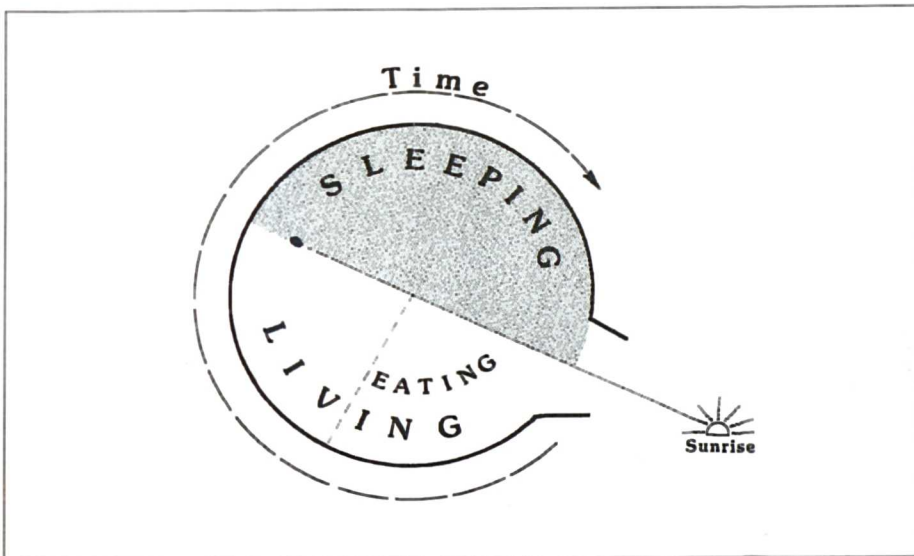


Fig 1.31 Fitzpatrick's (1994) model of use of space within the roundhouse

Chapter 2 Theory and Methodologies

"Stripped of its gratuitous anti-science posturing and heaps of badly-written blather, postmodernism can contribute useful ideas to social science"

(Schiffer & Miller 1999, 8)

2.1 Introduction

This chapter will outline the author's theoretical position on a number of topics related to the study of circular structures and prehistoric dwelling. Any biases inherent in the use of the data should thus become clear to the reader. In recent years, the dominant trend has been to emphasise the more social aspects of prehistoric settlement and the first section provides a discussion of new thought on the domestic sphere. In particular, there has been a deliberate injection of 'ritual' into settlement studies – the 'ritualisation' of the domestic sphere – culminating in the *cosmological model* and the second section provides a critique of this model. The third section suggests how we might achieve a more informed social archaeology: an approach which the current study will put into practice.

2.2 Rethinking the Domestic Sphere

"We can not continue to treat the record as unproblematic, and must stop isolating the 'other' as ritual . . . we should not treat our settlement record with complacency. It may be neither as familiar nor as domestic as we suppose. The realm of the everyday is not unproblematic, it is the problem."

(Hill 1989, 21)

Archaeologists traditionally view the domestic sphere as the preserve of women. It is also the arena for mundane, everyday tasks: those considered to be of low economic value. It is important that we situate this view of what constitutes the domestic. As with all disciplines, archaeology began as a subject written predominantly by men for a male audience. Until fairly recently, therefore, studies have been above all about those aspects of life with which modern man identifies: for example war and defence, industry and trade: fields traditionally thought of as being 'male'. The unquestioned female role in all this was to tend the household. In many archaeological studies, men are subdivided into societal categories determined most commonly by a notion of status or perhaps occupation. Women in prehistory – if mentioned at all – generally remain uncategorised: often viewed simply as the resource of a dominant male: an indication that we have been projecting modern (androcentric) values onto prehistory. It is apparent that still in archaeology the concept of woman – as domestic, passive, non-industrial

and non-political - is seen as timeless (Hodder 1986, 160). The prehistory with which we are so familiar thus remains a predominantly male view of our past (*ibid*, 159).

2.2.1 The Domestic-Industrial Divide

A number of models in settlement studies are based on a perceived dichotomy between domestic and industrial activities, where domestic = female and industrial = male (cf. Drewett 1979; 1982). As mentioned above, this dichotomy has its origins in the history of the discipline. At the time when archaeology was developing the vast majority of women had no social, political or economic freedom and the role of women in prehistory seems to simply mirror that of their Victorian counterparts. Following Ellison (1981), it has been suggested that Bronze Age women prepared food in a 'minor' house then 'took it to the men for consumption' in the 'major' house (Hingley 1990). Prehistoric women are inherently seen as low status and subservient. The dichotomy is fuelled by the assumption that female labour is opposed to, and has less 'value' than the labour of men (Hodder 1986, 159; Conkey & Gero 1991). Female labour is generally considered to be associated with domestic tasks: namely food preparation and textile production; whilst male activities are associated with industrial tasks (e.g. Drewett 1982; Inman *et al.* 1985, 200-210). This assumption is nowhere more explicit than in Clarke's (1972) interpretation of the Glastonbury Lake Village (Coles & Minnitt 1995). Clarke's theories on the sexual division of labour are laden with simplistic androcentric assumption based on a vision of the timeless domestic female and the dominant industrious male (Ehrenberg 1989, 144-145).

The perpetuation of this assumption is often justified by the fact that task distribution is divided between the sexes in a number of modern non-western societies. In some instances, use of formal ethnographic analogy (see 2.3.2) means that the tasks of modern women are projected back into prehistory. Grahame Clark, for example, assumed that skin-working at Star Carr was a female task simply because skin-working was practised by women amongst the Caribou Eskimos (Hodder 1982). Likewise, prehistoric pottery production is often assumed to be a female task purely on the basis of ethnographic parallel. Ethnographic examples do reveal that biological sex is commonly involved in task distribution; however such behaviour is culture-specific and cannot be viewed as a universal law (Hodder 1986, 160). It is methodologically unsound to project modern attitudes onto prehistory, be they our own or those of non-western societies. Also, are we sure that our ethnographic examples - written again, until recently, largely by men for men - do not record only what they understand to be true about women in society (Ehrenberg 1989, 18)? In some cases might they record only those aspects of a society which conform to stereotype?

We must consider that prehistoric communities operated according to customs and traditions very different from our own. Task distribution as determined by biological sex is only one of a number of possible scenarios. Self-sufficient communities, those with little scope for task failure, may have utilised all available labour, regardless of sex; the deciding factor being skill at the task in hand. For example tasks requiring strength, whilst largely suitable for men because of biological factors, may include the participation of strong women and exclude that of weak men. Perhaps gender – which is culturally-ascribed – should be our focus rather than sex. It remains possible that there *were* strict social divisions based on biological sex in prehistory but we should not *assume* their existence or character based on our own cultural rules or those of modern, non-western societies. Most recently researchers have been deconstructing the domestic-industrial dichotomy in settlement archaeology in a potentially more sophisticated understanding of prehistoric production (e.g. Ellison 1987; Brück 1999b; Gerritsen 2001; King 2001). A return to data reveals the settlement as the focus for the majority of everyday activities, both domestic and industrial.

2.2.2 The Functional-Ritual Divide

In the same way that the domestic sphere has been considered non-industrial - and female - it has also traditionally been viewed as distinctly practical or functional in nature (Hill 1989, 19). As such, it has attracted a functionalist approach to interpretation. Functionalism can be seen as a 'common sense' approach to archaeological data – for example, environmental determinism - which sees past human action as determined by certain universal laws and which implement the 'primacy of the material base' (Hill 1995a, 5; Hodder 1986, 31-32). Such an approach has been heavily criticised for being founded on modern 'efficiency' values and for neglecting the symbolic aspect of human behaviour. The functional-ritual divide may have its origins in the nature of later prehistoric sites: a domestic, subsistence-based 1st millennium BC contrasting markedly with the ritual monuments of the previous two millennia (Barrett 1989, 115; Hill 1989, 19). The 'familiarity' of a domestic record (Hill 1989) means interpretation is uncomplicated and straightforward (Brück 1999a, 323). As a result, subsistence activities – with which we can identify easily - and the domestic sphere as a whole have been seen as being devoid of symbolism (Barrett 1989, 115).

The dominance of functionalist methodologies means that 'ritual' activity has tended to be cast in a subsidiary role and defined, by default, as anything which is *not* functional. This occurs when the archaeology does not fit into a model provided by a modern functionalist perspective and such action serves to reinforce the dualism practical-symbolic (Brück 1999a, 317). As a result, our approach to 'ritual' has remained remarkably naïve, simply because it continues to be played out in the shadow of functionalism and continues to be defined *by* it. Even where there is

evidence for structured deposition, for example, this does not necessarily indicate past 'ritual' behaviour, instead it is evidence for *ritualised behaviour* which could, in fact, be distinctly *non-ritual* in origin. We assume past ritual action simply because these 'odd' deposits do not fit into our functionalist perspective (*ibid*, 329-330). Human behaviour is, in reality, an incredibly complex topic, one that cannot be adequately explained using the functional-ritual dualism. In stressing 'ritual' as simply non-practical action we have been moulding together at least four different types of ritualised behaviour into one catch-all 'ritual' category:

1. *Ritualised Practice*: the 'sub-conscious rituals' of everyday life, where seemingly normative practice is dictated by the tangled 'rules' of the agent in society – for example: the act of drinking wine from a glass rather than a mug.
2. *Agent-Based Ritual Practice*: the conscious, belief-based actions of an individual – for example: superstitions, religious belief.
3. *Group-Based Ritual Practice*: a more organised, group or community-based activity – for example: the playing-out of social roles to maintain group cohesion. Also the subtle or overt manipulation of a group by a power-seeking individual or collective.
4. *Ritual as Religion*.

More recently, studies have reacted to the traditional approach by insisting that *all* behaviour is ritualised. An attempt to escape the traditional functional-ritual divide - by stating that all human action is primarily ritual in nature - has instead led to the deliberate marginalisation of practical concerns (Brück 1999a, 325). However if we state that everything in the archaeological record has a symbolic dimension we have surely only succeeded in replacing one extreme position with another. By giving ritual action supremacy over practical action the functional-ritual divide is simply reaffirmed. In reality such a divide is false (Hill 1989, 21; Barrett 1991, 6). The two aspects are interdependent, it's just that we've reached each of them at different times in our discipline. Ethnographically, many societies do not distinguish between the two (Brück 1999a, 313; 326) and anthropology has been attempting to achieve their integration for some time (see Oliver 1989, 73).

2.3 The 'Ritualisation' Trend

Iron Age studies has embraced two main theoretical approaches since the late 1980s. First the process of 'prehistoricism' (Hill 1989) – an attempt to recognise the real *difference* of Iron Age life which has traditionally been interpreted according to our own criteria. Amongst other things, this has led to the deconstruction of Iron Age religion with the resulting collapse of the sacred-profane dichotomy (Downes 1997; Smith 2001). Second has been the struggle for a more social archaeology which aims at a greater understanding of the nature of human action (Hodder

1986). Such an approach has – because of the natural limitations of archaeology – seen a recourse to anthropology and most significantly to social theory. The realisation is that human action is complex and cannot be adequately explained by functionalism alone. This has led to the assumption – largely based on ethnographic data - that ritual behaviour takes priority over more practical concerns. The result of these two approaches in Iron Age studies has seen researchers trying to find evidence for ritual action in the domestic sphere (e.g. Parker Pearson 1999; Oswald 1997; Fitzpatrick 1994).

2.3.1 The Cosmological Model

In the late 1980s observations were made by JD Hill and Mike Parker Pearson regarding the apparent standardisation of roundhouse orientation in the Iron Age (JD Hill pers. comm.). These suggestions were tested in an undergraduate thesis which concluded that, in the British Iron Age, roundhouse orientation was dominated by the east - sunrise on the equinoxes - and the south-east - midwinter sunrise (Oswald 1991). The work was dismissive of environmental factors and it was suggested that structure orientation was related to ritual concerns, namely to sun worship (Oswald 1997). In 1994, two Early Iron Age round-houses in Wessex - Dunston Park and Longbridge Deverill Cow Down – were cited as evidence of a left-right/north-south division of space in the roundhouse. In this model the right side - with finds - represents an activity area and the left side - with less finds - represents an area for sleeping and storage activities. This pattern was linked to cosmological referents and, more tentatively, to patterns in orientation (Fitzpatrick 1994).

In 1996, a link was developed between the patterns in orientation, and Fitzpatrick's (1994) left-right division of activities. The key lay in the movement of the sun; the movement of time, around the house. This was apparently supported by evidence for the 'guiding' nature of the entrance kerbs at two wheelhouses in north-west Scotland (Parker Pearson & Sharples 1999, 17). These structures, and others in the Western Isles were also reported as having activities split between their left and right sides (*ibid*) and it was further suggested that movement around the house was undertaken in a sunwise direction (Parker Pearson 1999). The use of space was also seen as structuring gender and status roles in Iron Age society (Parker Pearson & Richards 1994; Parker Pearson 1996). These arguments were supported via the use of ethnographic analogy. By the late 1990s it was confidently stated that sun-based belief systems had existed across Britain for the best part of a millennium and that these determined the prehistoric use of space (Parker Pearson 1999, 60). Within just ten years, the cosmological model had moved from tentative suggestion to suggestive fact.

2.3.2 Deconstruction

Such ideas of cosmology have been seen as overly simplistic (cf. Barrett 1994) and Rapoport (1990) has objected that the link between architecture and human behaviour is by no means implicit. Although the cosmological model has quickly achieved the status of received knowledge in some quarters, deconstruction has already begun. Jo Brück, for example, states that such work has had the negative effect of strengthening the functional-ritual divide in archaeology with its continued, if inverted, application (Brück 1999a, 325) and Fraser Hunter (forthcoming) has contested claims regarding a left-right distribution of finds in wheelhouses. The model can also be critiqued from a methodological perspective (Pope forthcoming). Main problems include the use of formal ethnographic analogy and structuralist theory; a rejection of functionalism; and its recourse to grand narrative despite extrapolating from only a few archaeological examples. The model also relies on an inspired yet essentially naïve interpretation of the orientation data (5.2.3). As will be shown, the model does not fit a wider assessment of the evidence and whilst sun-based traditions may have existed in the Iron Age the current model has failed to identify them with any conviction.

Fitzpatrick's (1994) original idea regarding left-right division of space may be supported for the two structures which he considered - at Dunston Park, for example, the depositional context of the majority of finds does support deposition during structure use and at Longbridge Deverill Cow Down destruction by fire means that the assemblage is perhaps more likely to represent use activities – but its incorporation into the cosmological model remains problematic. Unfortunately not all studies which have followed Fitzpatrick's work consider the formation processes of the deposits which they study (e.g. Parker Pearson & Sharples 1999; Cole 2000). Instead many so-called contextual studies apply the 'Pompeii premise' - where artefacts are seen as indicating use activities regardless of context or the processes by which they became incorporated into a deposit (Schiffer 1985). The fact remains that the majority of artefacts in the archaeological record have been removed from their primary use context. In addition the processes involved in abandonment (8.2.1) have often significantly altered household assemblages. Without an understanding of formation processes then, the use of terminal deposits for determining prehistoric use of space is unreliable.

Perhaps the main cornerstone of archaeology is the proper use of analogy (Hodder 1982). In recent years the swing back towards anthropology means that this has again become a salient issue. There are two types of analogy: *formal* analogy and *relational* analogy. Wylie (1985) describes formal analogy as 'unsystematic' and 'indiscriminate': where associations between the source and subject are assumed rather than proved. Such analogies are weak in that the observed association may be fortuitous (Hodder 1982). For example – a technological similarity leads to

assumptions regarding cultural similarity regardless of time or space between source and subject. Relational analogies, on the other hand, seek to prove relevance - a natural or cultural link - between the two (*ibid*). In this respect Hawkes' (1954) ideas regarding archaeological inference – practical action is safer to infer than culture - may still be regarded as important at least for the use of analogy, if not for archaeology as a whole. Ethnography can be a useful tool in archaeology, enabling us to think outside our own experiences, however, the *application* of ethnography-based models is more problematic: "it is when meanings are applied cross-culturally, without reference to context, that the dangers emerge" (Hodder 1986, 51).

Both Parker Pearson (1996) and Oswald (1997) use formal ethnographic analogy to argue for sun-related belief systems in the Iron Age roundhouse. The former transfers ideas on the use of domestic space from Levi-Strauss's Bororo Indians and Bourdieu's Berber. Oswald's sources are the hogans of the Hopi Indians and the Mongolian yurt. In each case source and subject are thousands of miles and years apart. Essentially the argument is that because prehistoric roundhouses are round, are oriented and are pre-industrial, we can apply use of space and belief systems from modern roundhouses. After Hill (1989), both Oswald (1997) and Parker Pearson (1996) accept that our own structures are not valid in the Iron Age; yet they appear not to have a problem with the projection of modern *ethnographic* structures. Is there still, perhaps, a subconscious, lingering readiness for us to assume that prehistory, as pre-'us', has a natural parallel in modern 'primitive' societies (cf. Kuper 1988)? It is suggested that the use of ethnography regarding cosmologies is only valid for a consideration of the *variability* of the cosmological form.

To declare an understanding of prehistoric cosmologies is a bold claim. It is still a matter of debate as to whether such abstract concepts can in fact be retrieved archaeologically. And whilst our understanding of *cosmology*, as a structuring principle, has increased; we are only just *beginning* to explore what we think prehistoric cosmologies may have included (Hill 1995a; Brück 1999b). The cosmological model has shown that we are too keen too soon: the temptation is to cut corners. The fact is that we still have much groundwork to do. We can not compensate for archaeology's limitations by projecting modern ethnographic belief systems *onto* prehistory. This is simply poor methodology. The concerns of past ideology are culturally determined and entirely culture specific and, as such, are not open to cross-cultural parallel. For the author's work at least, the request to use the cosmological framework to interpret human action and agency is denied. The sun-based cosmological model is a modern construct which actually works *against* the identification of Iron Age ideologies. We cannot *create* a structure and use it to interpret the archaeological record. If we set out to apply sun-based structures from ethnography we will naturally *find* sun-based structures in prehistory. The problem is that early post-processualism heralded just such an approach.

2.3.3 Losing Structuralism

"Structuralism is notoriously linked to unverifiable flights of fancy,
ungrounded arguments . . . [and] imagination"

(Hodder 1986, 49)

Hodder (1986) argues that the materialist base of systemic (processual) approaches is invalid because materialism is a modern, subjective methodology. The alternative, apparently, is structuralism. As a reaction to the objectivity claims of processualism, structuralism places the emphasis firmly on the primacy of subjective interpretation (Hodder 1986, 36). Researchers construct models of social structures in an attempt to understand human action. In this way we simply repeat the same mistakes again by replacing materialism with a more diverse set of formal analogies often taken from ethnography. The result is a variety of models which claim a view of past human action, even past ideologies but are nonetheless reliant on the application of a heavily subjective model. These models can rest on any assumption from gender roles to perceptions of the environment. But why should the assumed universality of these things be any more acceptable to archaeology than more materialist concerns? It can be argued that rather than moving on from processualism, structuralism merely re-packages much of the processualist methodology. These approaches are no less inherently biased, their authors just seem to think that they are! In addition – because of the variety of analogies and the lack of self-aware methodologies – these approaches are far more difficult to critically assess without full deconstruction.

The cosmological model is heavily influenced by structuralism, in particular Bourdieu's (1973) work on the Berber Kabyle house and the link between biological sex, status and the subconscious division of space. Following Lévi-Strauss, Bourdieu's work is defined by his use of binary opposition. Berber women are apparently subconsciously associated with the dark, low part of the house and, for Bourdieu, are therefore linked to death, sex, raw food and manure whilst the men are associated with nobility, honour, dialogue and culture. But his argument linking biological sex to the division of space is actually extraordinarily weak. In the same text he tells us that, in fact, it is the *men* who sleep in the dark half of the house, whilst women work *throughout* the house during the day. Structuralism displays a distinctly Marxist view of gender division – one of power and status – whilst ethnography reveals a more relaxed attitude to gender division: as a means of dividing labour (Denyer 1978, 92). The link between ordered space and gender is not implicit (Tringham 1991) and the principles behind structuralist anthropology have now been brought into question (Carsten & Hugh-Jones 1995; Green 1999). Gender divisions and binary oppositions have recently been used as a means of identifying prehistoric use of space and cosmologies (Hingley 1990; Parker Pearson 1996). We have to be

aware that with this approach we may be merely engendering artefacts and situations according to our own culturally-inherent, androcentric misconceptions.

Hodder's assertion of the need to assign meaning to the archaeological record as a necessary stage in analysis is correct (1986, 44). Structuralism, however, appears to take this as *carte blanche* (*ibid*, 169). An overemphasis on the subjectivity of the researcher (*ibid*, 16; 40) has led to the belief that interpretation is a means to an end. The irony is that the real value of post-processualism has been ignored. A major aim was to correct the main flaw - the neglect of the individual - in processual methodology. Human action is not suddenly visible because we *think* it is; we cannot simply resort to formal ethnographic analogy. Archaeological interpretation should be undertaken with an attempt to be *as objective as possible* within the limits of our own subjectivity. Interpretation must be self-aware (Hodder 1986). Data should not be deliberately selected to fit a model; whilst data which contradicts the model is ignored (Cunliffe 1999). Equally, the concept of 'resistance' (e.g. Parker Pearson 1996) should be abandoned: "one could argue that a 'transformation' of the structure has occurred in the cases that do not 'fit', but at some stage one's intellectual ingenuity becomes implausible, at least to others" (Hodder 1986, 53). It is the responsibility of the researcher to adapt his or her model when it becomes clear that it has become overly subjective (Wylie 1993, 24). In all, structuralism – with its tolerance for overly subjective interpretation - is not the best way to achieve a contextual archaeology.

2.4 Towards an Informed Social Archaeology

In Iron Age studies, the application of both systemic and structuralist approaches have tended to reduce human behaviour to those generalised factors which fit in with a preconceived model. Whether such models are based on environmental determinism and functionalism, modern assumption, or formal ethnographic analogy they all tend to overemphasise one aspect of human behaviour at the expense of others. In the final sentences of Hodder's (1986) *Reading the Past*, the plea is for an understanding of *both* functional and ideational meanings in the past. Structuralism, however, has failed to do this. Instead, archaeologists are beginning to see the need for an understanding of how the individual operates both within the natural and the human environment to produce a particular social system. Essentially, trying to understand the science of culture. This is being achieved through the use of social theory.

2.4.1 Understanding Human Action

Archaeology – partly as a result of the long-term nature of the data – has traditionally focused on societal structures. Human action has essentially been taken for granted. However new work in social theory provides us, for the first time, with a basic framework: a way of understanding

how society can be both large-scale and small-scale at the same time. We can now begin to understand how societies operate and how the actions of an individual play a role in the reproduction of society. By being aware of this work we can approach the archaeological record with a greater understanding of how it was formed. In order to move towards an informed social prehistory, we must attempt to grasp several ideas concerning human behaviour. First, human action is paramount, and both practically and ritually-led. Second, there are biologically-determined human responses to certain conditions: structuring principles. Third, the relationship between the individual agent and the social system is intrinsic to the operation of each.

Prehistoric Rationality

"prehistoric people applied an historically-specific logic to the world about them. This comprised a set of culturally-specific values, aims and rationales which shaped their practical interaction with the world. It is surely these that should form the focus of archaeological interest"

(Brück 1999a, 327)

The nature of human behaviour means that not all archaeology will be the result of what we consider to be rational action. The 'ritualisation' trend reveals that we remain surprised by the presence of apparently non-'functional' action. In fact, we should be *expecting* to find patterns in our data that we cannot immediately understand. In an attempt to move on from the application of the modern and distinctly restrictive functional-ritual dualism, Brück (1999a) prefers to aim at the identification of prehistoric 'rationality' where ritual action has a functional dimension and vice versa (*ibid*, 320; 325-326). Perhaps all behaviour should now be seen as lying somewhere along a functional-ritual spectrum with the majority of behaviour resting between the two extremes. Shaping behaviour on such a spectrum is the task of the individual researcher. The current author favours the kite-shaped model as shown in fig. 2.1 where the majority of tasks are positioned between the two extremes and there is a very slight emphasis on the functional.

When the trend for promoting ritual action at the expense of the functional has ceased we will hopefully reach a period largely devoid of theoretical extremes: when we can instead concentrate on past human action as an integrated whole. At this point we will again focus on the data itself and head towards a greater understanding of distinctly prehistoric rationality. In structuring this thesis - rather than providing a separate section on 'ritual' - the decision was made to incorporate any evidence for ritualised behaviour *alongside* what are considered to be more 'functional' topics. The aim is to discourage readers from thinking about 'ritual' as a separate topic by denying them the opportunity to read it *as* such. This took some effort on the author's part but it is believed that only by such deliberate action will we move towards a more integrated approach to human action (Brück 1999a). The archaeological record can now be seen

as the result of human action, the nature of which differs between individuals and between groups. Rather than trying to label prehistoric human action we should perhaps first attempt to identify it. A particularly useful approach is that which considers the routines of everyday life (Hill 1989; Parker Pearson & Sharples 1999; Giles & Parker Pearson 1999; Cunliffe 2000, 58).

Structuring Principles

The current marginalisation of functionalist concerns with claims of modern efficiency values is misguided. The current author, for example, is not yet convinced that 'efficiency' is a completely modern concept; certainly it can be seen as fundamental to a capitalist world-view but further work must be undertaken before assuming that principles like efficiency had no place in prehistory. There is enough evidence from anthropology to suggest that functionalist concerns should be studied by archaeologists. Certain ideas based on human ecology, for example, may have more weight than recent arguments have allowed. We are now aware that functional concerns cannot easily be separated from cultural behaviour (Brück 1999a); those behaviours which tend towards the functional end of our functional-ritual spectrum, however, may be studied via a critical application of functionalist principles. Our data – provided it is collected with limited bias – does have the ability to reject an inappropriate application of functionalism (Wylie 1993). There is real potential here if we can approach such matters without the constraints of theoretical extremism. The question is whether we are at a stage where we can identify such behaviour without resorting to the application of inappropriate models.

It has been suggested – after work in the natural sciences – that there are universal principles that affect human behaviour; that there are certain natural laws and basic human responses which work across space and through time. According to Hodder (1982), for example, technology-based analogy is acceptable because of the *cross-cultural nature* of physical constraints on materials in relation to natural, physical and chemical laws. It can be assumed that the basic principles of water, wind, and fire have remained more or less constant, as have the universal characteristics of clay, metal, stone and wood (Hodder 1982, 92; 210). In the same way, biological laws apply, in that human beings have always needed to gain shelter from the elements, eat and drink, sleep, reproduce etc. Gould (1980), for example, suggests that we should aim at identifying those physical, biological limiting factors – those firmly established in the natural and biological sciences – so that we project onto the past only behaviour that we know to be biologically or physically determined. This could then constitute a 'baseline' for interpretation. Our postmodern training makes us recoil from such a proposal but perhaps we should try to keep an open mind.

We can also assume that certain aspects of human action are influenced by what can be called 'structuring principles', for example, concepts such as 'efficiency', 'security', 'territoriality'. The *characteristics* of which are culture-specific but the general concept - in its most basic form - may be cross-cultural. Such a suggestion naturally remains conjectural. Different cultures, however, are not *completely* unique and the disciplines which record human behaviour display evidence for the reproduction of certain general behavioural forms. Whether it is possible to identify structuring principles in archaeology without resorting to formal analogy, however, is debatable. It may be possible to achieve an understanding of such matters via inter-disciplinary research (e.g. Bintliff 1988). The current author believes however that, as a young discipline, we are still far from being able to tackle successfully what is a very ambitious agenda. This is confirmed by the fact that few researchers in archaeology consider such matters today; this is not purely because it is no longer theoretically fashionable but also because it is extremely complex. Our inability as yet to understand structuring principles, however, does not mean that we should disregard them completely.

Agent and System

Every agent is a member of a number of different and sometimes conflicting social groups - a family, a generation, different working groups and so on. The result is a series of overlapping elements, each helping to make up the social system. This can be illustrated by exploring how a community react to an unexpected, late snowfall. If the community equates snowfall with bad luck, for example, the majority of the community will be dismayed. Those who are not superstitious, however, will react differently. Breaking this down further with the factor of age: the community's children are elated; the young adults indifferent; the older adults disgruntled; the elderly fearful as age brings with it increased responsibility, decreased mobility, increased susceptibility to the cold etc. We could choose another factor: occupation. Farmers are disgruntled because they must rescue new lambs whilst labourers are happy as they get the day off work. These are all fairly general statements: ones typical to archaeology. The individual, however, can work against the trend, so we can have the child who hates snow or the old woman who adores it. Becoming increasingly complex, an individual may love morning snow but, after a day's worth of circumstances, detest it by the afternoon. How can archaeology capture these different levels of interpretation? Is it possible?

Fig. 2.2 is an interpretation - and a slight re-working - of Giddens (1984) *The Constitution of Society* where the action of the individual leads to social reproduction and innovation within the social system. The process can also reproduce or cause change in the individual. The social system and its structures, the natural phenomenon of human agency, the monitoring activities of others, and interaction with others, are all factors which can be seen as having an influence on

human action. Human action is also seen to have intended and unintended consequences. Why is this work relevant to archaeology? Human behaviour creates archaeology. Human behaviour is incredibly complex – as shown above – and can be represented at many different levels. One of post-processualism's main arguments was that processualism often ignored the fact that archaeology is about people and instead became absorbed in artefacts as fossils and self-supporting systems. By turning to social theory and the work of Bourdieu (1977) and Giddens (1984) we are reminded what archaeology must be about: human action. These works move against complacency in archaeology. Perhaps most importantly we learn that it is human action that creates and reworks the structures of a social system, which in turn structures human action.

2.4.2 Structure as Agency?

We can accept that human behaviour involves the phenomenon of agency; however, as archaeologists, we have been unable to isolate this with any real conviction. John Barrett (forthcoming) recently noted that agency has not been successfully applied in prehistoric archaeology bar perhaps to some degree in the work on structured deposition (e.g. Hill 1995a; Brück 1999b). Even then it has only been glimpsed by the analysis of 'odd deposits' which are identified according to functionalist principles (Brück 1999a). Post-structurationism emphasises the problems inherent in a structuration theory which in practice sees the abstraction of agency with even Giddens himself returning naturally to the discussion of structures (MacGregor 1994; Parker 2000). As well as the problems with agency, we are far from even a theoretical understanding of structuring principles. In an attempt to combat the agency problem Barrett has suggested that agency may be thought of as objective as well as subjective rather than as purely the latter (Barrett forthcoming). Is this where structuring principles might come in? More importantly is this the first step towards the deconstruction of the hallowed agent:structure dualism? Perhaps it is useful to focus on the fact that both agency and structuring principles exist *within* structure. Structures are not *external* to human action, they *are* human action.

Arguably the most successful way to study agency archaeologically is via historical structure: recognising the production and maintenance of culturally specific trends both across space and through time (Barrett 1987; Bintliff 1988). There is a need to understand agency as an historical force (Barrett forthcoming). The work of Fokke Gerritsen, for example, incorporates an understanding of human action but confidently reinstates the study of historical structure at local, regional, and supra-regional level (Gerritsen 2001; Gerritsen forthcoming; Roymans forthcoming). Studying *the patterns of agency* (structures) is perfectly acceptable in archaeology so long as we remain aware of what such structures represent in terms of human action. It has been assumed that identifying ritual action will reveal the actions of human agency. In truth, what we have been seeing as 'functionalist' studies also identify human agency. Getting rid of

the functional-ritual divide means accepting that *all* past activity is agency. Agency is not just the subjective, small-scale action of the individual; it is agency that forms structure. If agency and structure shape each other as Giddens suggests (fig. 2.3), then it can be argued that each *incorporates* the other (fig. 2.4). Can we begin to think of structure as agency and agency as structure?

2.5 Discussion

This chapter has been an exercise in getting down on paper the various criticisms and alternative ideas which together combine to form the author's current theoretical position. The following paragraphs will summarise the main points. The domestic-industrial divide is based on androcentric, *a priori* assumption and should be abandoned. In playing down the functional-ritual divide, we should instead think of these facets of behaviour as the two ends of a behavioural spectrum. The cosmological model is rejected as an artificial construct along with the ritualisation trend as a whole. We should abandon structuralism with its emphasis on subjective research and models based on formal analogy. Formal analogy – whether modern, historical, or ethnographic – is not the best way to achieve an informed social archaeology. This must be achieved via techniques which are both methodologically and philosophically sound. We should aim for robust analysis of large, high quality datasets, identifying patterns and anomalies, through time, at local, regional and supra-regional level; alongside multidisciplinary theoretical approaches which will help us achieve a fuller understanding of the real complexity of human behaviour.

Rather than top-down structuralism, which applies a preconceived model, we need a bottom-up prehistory that starts with the data and where the interpretative structure is the *final* part of interpretation. In this way the subjective nature of enquiry is limited to that which is unavoidable. If our theory and methodologies remain self-aware, we can minimise overly-subjective interpretation. As such, the structures we identify are less likely to be those we have created. In analysing our data we need to apply several techniques as standard: an appreciation of archaeological survival and of formation processes, a critical application of functionalism, and an 'awareness' of agency and structuring principles. We should remain open to the possibility of identifying agency, particularly in local-level analysis, but should not believe that the value of archaeology is diminished if we cannot. We should no longer be ashamed to study historical structure in archaeology. Agency creates social structures. Studying structure is what archaeology can do best. It is possible that with theoretical advances human agency may become more attainable for future archaeologists. If we continue to develop our methodologies in parallel with our theory we may begin to gain an understanding of decidedly prehistoric rationality.

When, as archaeologists, we refer to the material record we automatically accept responsibility for presenting a 'truth'. With postmodernism we have argued that all interpretation is subjective and as a result there *is* no archaeological truth. This argument has been used to suggest that there is no *point* in attempting to be rigorous, as all interpretation, however subjective, is valid. This is not only misguided, it is also unprofessional. All interpretation *is* subjective; extreme subjectivity, however, can and should be harnessed in an attempt to be *as objective as possible*. If academics don't behave in a responsible and professional manner – if we show no respect for our data – how can we expect our fieldworkers, the media and the public, government and funding bodies, and even our own institutions, to regard us as a serious discipline? The processualist vs. post-processualist sniping and side-taking has caused untold damage to our discipline. If we are serious about narrowing the gap between theory and practice, we must analyse the methodologies behind our theory as we do the theory behind our methods. It is time that we were all both theoretician and scientist. Bradley (1994) is right when he states that the discipline cannot sustain the split indefinitely. Processualism often ignored the individual; ideas from post-processualism have corrected that flaw, as a result it is time now to get back to the archaeology via the application of ideas from both schools of thought.

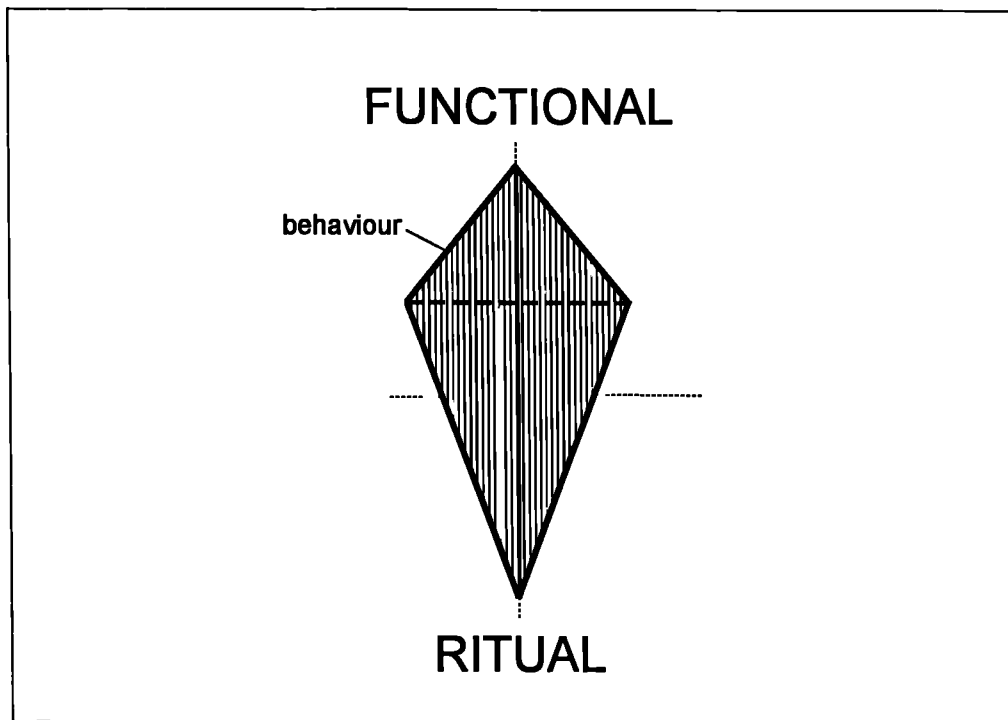


Fig 2.1 The Functional-Ritual Spectrum

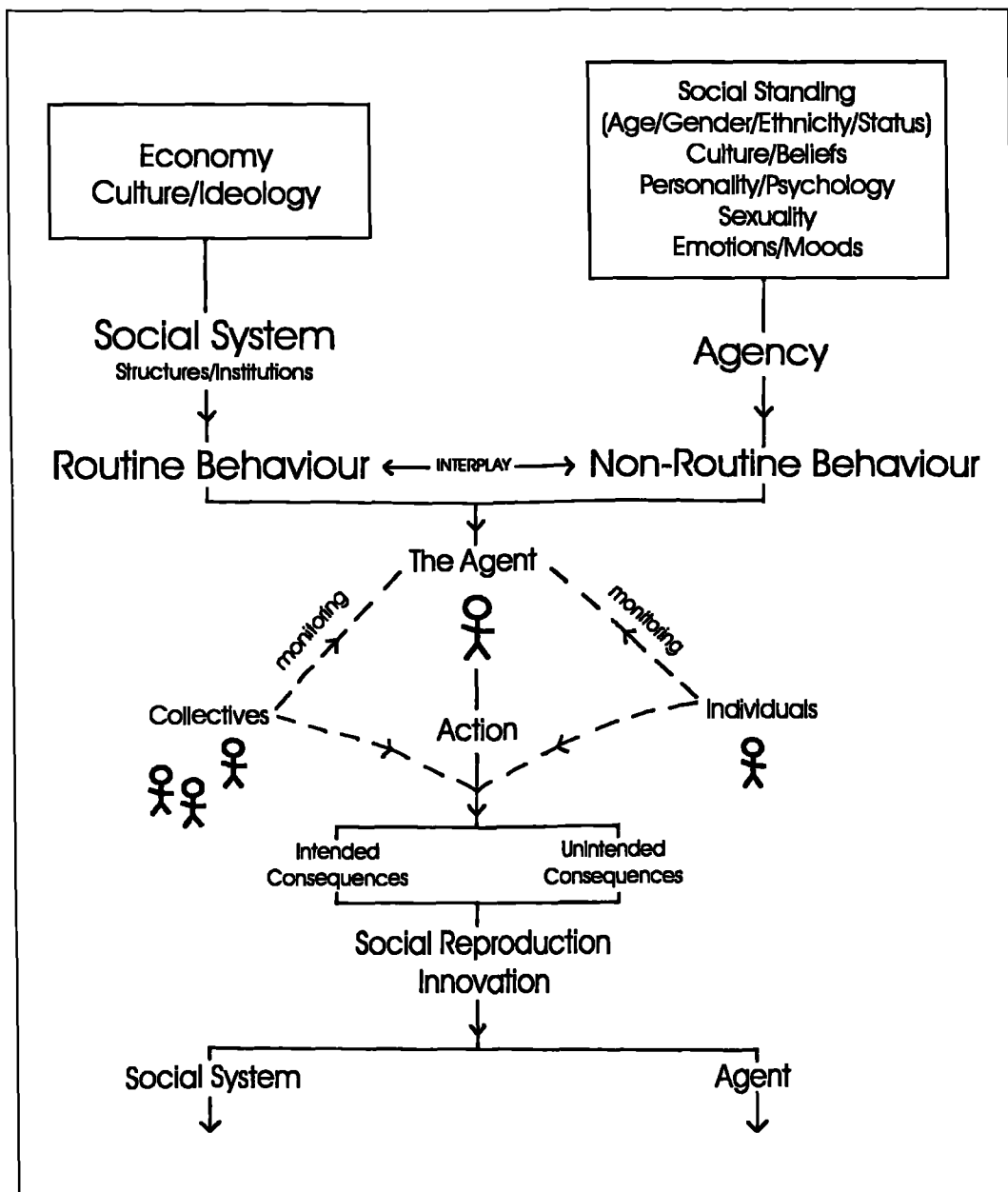


Fig 2.2 Agent and System (after Giddens 1984)

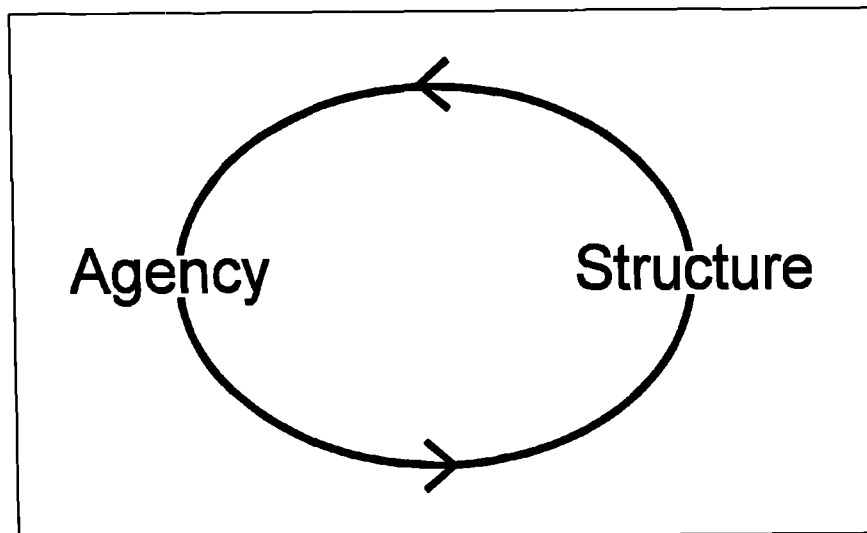


Fig 2.3 Structuration Theory

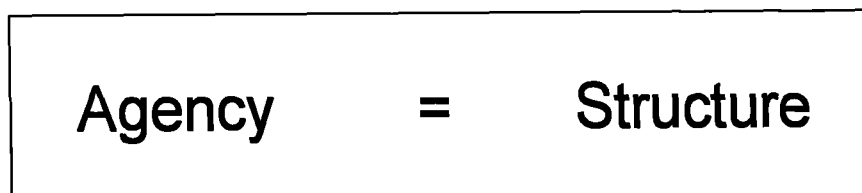


Fig 2.4 Structure as Agency?

Chapter 3 Data and Methods

"I have tried to let facts do the work for me rather than opinions; and where they will not, to deal warily"

(Hawkes 1960, 3)

3.1 Methods

3.1.1 Data Selection

The data used in this study includes all excavated and published timber and stone-built circular structures north of a line from Aberystwyth (Ceredigion, Wales) on the West Coast of Britain, to the Wash (using the border between Lincolnshire and Norfolk) on the East Coast (fig. 3.1). The aim was to correct a perceived research bias which focuses on southern England. The developed architectural forms of Atlantic Scotland – the duns, brochs and wheelhouses – were excluded from the study. These structures have a lengthy tradition of study and it was considered that reading the extensive literature would absorb too much time, whilst the substantial nature of their features would confuse analysis. As a guideline, only stone walled structures with a wall width of less than 3 m were included in the study. Structures of all date were included in an attempt to provide a long-term perspective. The decision was taken to use only published information in the study and not to go to archive or the SMR. Using only published sites served as an obvious boundary and helped to keep numbers to a manageable level.

The literature search involved an extensive survey of over 100 national, regional and local periodicals, as well as relevant monographs. The majority of periodicals were searched from 1930 onwards as, even at this date, a more 'antiquarian approach' to excavation and publishing tends to concentrate on finds produced through excavation, with little mention of structures. There are exceptions to this general rule especially it seems where an antiquarian society have an active field element from an early date, as with Tate's work in Northumberland. Exceptional material like this was included. The end date for the literature search was taken to be 1999. The decision was made to use the 2000 report on the site of the Dod, Scottish Borders (Smith & Taylor 2000) as the information it provided differed significantly from earlier reports. In defining what was an acceptable level of publication I decided on the need for an excavated plan or, if a plan was lacking, a highly detailed description including basic dimensions.

It was decided that *all* possible information available on any structure should be gathered and put into a database. Whilst time-consuming, this method would ensure that interpretation would not be limited by selective data collection. It also meant that as methodologies developed and changed during the period of the study, the data remained flexible and able to cope. For the

same reasons, both partially-excavated and poorly preserved structures were accepted alongside 'better' examples, the idea being that they would still provide some information of value to the study. Many structures survive as just an arc of wall-slot cut into subsoil and are devoid of deposits, but even from this we can obtain information on construction type, as well as gain an idea of structure diameter. For this reason no structures were excluded from the study on the basis of evidence quality; instead, evidence quality became a part of the study.

3.1.2 The Database

The database was constructed using Microsoft Access and consists of 1178 circular structures from north and central Britain, dating from the later Neolithic to the Roman Iron Age. Figs 3.2-3.3 present a regional and chronological breakdown of the dataset. Appendix 1 takes the form of a gazetteer of sites. Separate phases have been recorded as separate structures only when there is evidence for rebuilding, or redesign – e.g. in orientation - of the structure; repair and factors such as hearth renewal/repositioning are treated as part of the original structure (for further clarification see 7.2). The database holds the maximum amount of published data for each structure, in over 100 fields. As well as the more basic information such as details, dimensions and deposits, material is supplied on positioning and patterning with a view to providing information regarding use of space. Data is held under the following headings: general and site information; evidence quality; structural details; the outer wall; internal features; the entrance; internal space; external space; finds; and internal supports. Each of these topics is broken down further into a number of general fields:

General: Site and Structure Name; County; References

Site: Height above SL; Slope/Location; Site Type; Site Orientation

Evidence Quality: Date Excavated; Damage; Survival; Evidence Quality

Structure: Structural Type; Period; Diameter; Area; Shape; Repairs/Rebuilds; Wood Types

Outer Wall: Feature Details; Dimensions; Fills

Interior: Hearth Details; Partitions; Interior Posts; Floor; Deposits; Pits; Wear; Other

Doorway: Porch Details; Orientation; Dimensions; Deposits; Doorposts; Thresh; Other

External: Drainage-Gully Details; Eaves-Post Details; Annexes; External Features

Finds: Subsistence; Textiles; Metalworking; Display; Craftworking; Other; Context

C-R and Periphery: Diameter; Feature Details; Dimensions; Fills

I-Rs and I-Zs: Diameter; Feature Details; Dimensions; Fills

The majority of data held is LrIA and RIA in date and there is a bias towards the North Wales and the North Sea regions. These biases are acknowledged in both analysis and interpretation. In

Site	Region	No. of CSs	Structural Type	Ev. Quality	Period	Platform	HOD	Slope	Site Orient.	Diam. & Area	O Wall Type	CS Orient.	Porch	D-G
Braich y Dinas	N. Wales	32	•		•	•	•	•	•	•	•			•
Breidden	N. Wales	25					•	•	•	•			•	•
Coton Park	Lowland	39		•	•	•		•					•	•
Garton Wetwang	Yorkshire	79	•	•	•	•					•	•	•	
Hartburn	North Sea	38	•	•		•	•	•	•	•	•		•	•
Moel y Gaer	N. Wales	37	•	•	•	•	•	•		•		•	•	•
Murton High Craggs	North Sea	25	•	•		•	•	•	•					•
Thorpe Thewies	North Sea	21			•	•	•	•						•
Woodend Farm	Irish Sea	24		•	•	•					•			•

Table 3.1 Distorter sites and the fields in which each has the potential to distort

addition, nine sites have been identified as 'distorter sites'. These are sites that have more than twenty structures and also reveal evidence for the standardisation of features in a number of fields. This might be in part due to interim publication of a site where the supply of detail is limited and evidence quality is therefore poor. For example, because Garton-Wetwang has 73 structures - all of which provide 'poor quality' information - inclusion of the site in statistics on evidence quality will give a distorted view, especially for the EIA and for Yorkshire. Factors dealing with location, too, mean that, for example, a particular slope direction would be over-represented for a particular period or region. There may also be genuine standardisation of features for example structure orientation at Moel y Gaer - which, because of the high number of structures, will distort real patterning in the data. Table 3.1 reveals in which fields each of the nine sites is considered to create distortion. This factor has been taken into consideration in data analysis and where necessary, distorting statistics have been removed in order to clarify the situation and minimise misinterpretation of the data. If evidence from a *distorter site* was found to be non-distorting for a particular field it then remains in analyses.

3.1.3 Measurements

Measurements taken from plans are naturally fallible because of the high margin of error in measuring features depicted at such a small scale. The following reveals the guidelines used when recording the measurements associated with diameter, area, feature dimensions and the spacing of uprights.

Diameter

The diameter of a structure is taken as the internal diameter and is measured from the internal edge of the outer wall feature. Where the outer wall feature survives incomplete, diameter has been established by following the curvature of the surviving feature(s). In sub-circular and ovoid structures a measurement is taken along both the long and the short axis, these are then used to provide a mean diameter figure. The cut of a feature may not provide the extent of the upright itself. Analysis of dimensions taken from outer wall postholes with post-pipes reveal that there is a mean variation of 0.16 m between the width of the posthole and of the post itself. As a result, the diameter of any given structure can be as much as an average 0.16 m out because of this factor alone. A certain margin of error is unavoidable, but by remaining consistent, all measurement data should at least be relative. Drainage-gully diameter is taken from the gully centre to the centre of the gully on the opposing side.

Area

The following provide the equations by which structure area can be worked out (see fig 3.4). In sub-circular and oval structures a mean radius figure is used. Only three structures - Dryburn

Bridge, CS2 (Triscott 1982); Candle Stane, CS1 (Cameron 1997); and Broxmouth, CSB (Hill 1982c) – were recorded as quad-rings (Q-Rs)². In these cases, there appear to be two inner-rings and thus two inner zones are believed to be present. For these examples I-R1 and I-R2 values were added together to provide a mean I-R figure for feature width and spacing. The diameter of the outer I-R is used and the area of both Inner Zones is added together to provide a total Inner Zone area.

In simple-ring (S-R) structures: $\text{Area [a]} = \Pi r^2$

In double-ring (D-R) structures:

$$a = \Pi r^2$$

$$Ca = \Pi C-Rr^2$$

$$Pa = a - Ca$$

In triple-ring (T-R) structures:

$$a = \Pi r^2$$

$$Ca = \Pi C-Rr^2$$

$$Pa = a - I-Ra (\Pi I-Rr^2)$$

$$IZa = a - (Pa + Ca)$$

Feature Dimensions

Feature depth is given as the maximum measurement, it was assumed that truncation would be a significant factor regarding feature depth and a mean measurement may be more misleading. Feature width is given as a mean measurement of the total range; except in cases where an anomalous feature – such as one especially-large post-pit in a whole series of small-sized examples – would distort the average and mislead the true situation; in these cases a more representative figure is used.

Spacing of Uprights

Taking the measurement from the centre of one posthole to the next is a method with good precedents when calculating the average spacing of timber uprights. In the absence of post-pipes, measuring from centre to centre cuts out any confusion caused by the enlarging of features during repair or salvage activities. Measurements were only taken between postholes where it seemed likely that no postholes were missing due to truncation. The figures do not include spacing of posts at the doorway – a doorway is generally wider than spacing between uprights and inclusion of this measurement would create distortion – except in those cases where the doorway remains unidentified.

² At the time of data collection these structures were very poorly published. Following analysis, their interpretation as quad-rings can now be disputed.

3.1.4 Categorisation

In creating the database, numerous decisions had to be made regarding categorisation of data and the following sections set out how and why those decisions were made regarding the major topics of chronology, geography, site types, finds, and structure function.

Chronology

The data was divided into seven blocks of time, each – bar the LBA - roughly 4-500 years long (see below). Whilst the problems of Scottish chronology are appreciated – e.g. the extension of an EIA culture – for the purposes of this study such cultural differences are not sought and a standardised chronology was used across the study area to provide clarity in analysis. The current author prefers to think of the chronological divisions as providing convenient 'blocks of time' for analysis and uses pre-existing nomenclature for the sake of clarity and cross-reference only. Four transition periods are used, each of which contains both sites which are known to bridge the transition period and those which could belong to either period but where dating was unable to clarify matters further. The transition periods are: LrNeo-EBA; LBA-EIA; EIA-LrIA; and LrIA-RIA.

LrNeo (Later Neolithic 2500-2000 BC)
EBA (Early Bronze Age 2000-1500 BC)
MBA (Middle Bronze Age 1500-1000 BC)
LBA (Late Bronze Age 1000-800 BC)
EIA (Early Iron Age 800-400 BC)
LrIA (Later Iron Age 400 BC-AD 50)
RIA (Roman Iron Age AD 50-400)

There were too few transitional Bronze Age sites to warrant their own categories and these were instead put into the most likely period according to their date, helping make analysis much clearer. Pre-1960 dating has been treated with caution. Sites dated by traditional methods to the traditional Early Iron Age period (c. 550-350 BC) have been given a more loose 'EIA-LrIA' date. Uncalibrated radiocarbon dates were adjusted using Stuiver & Pearson (1986) and Pearson & Stuiver (1986). Some problems were encountered with dates used in Rennie (1997) and these are outlined in Appendix 2. Only 127 structures – those with a general 'BA', 'IA' or 'BA/IA' date – were excluded from chronological analyses. The structures were, however, included in general and regional analyses.

Geography

The study area was divided into six regions (fig. 3.1) in the expectation that large-scale regional trends in the data might be made visible. Boundaries were chosen on a geographical basis;

separating different land types, and modern local authority boundaries were adhered to – according to the 1994 Local Government Act in Scotland and the more recent changes to county boundaries in England and Wales in 1998. Stuart Piggott's (1966) use of the Forth as a boundary was upheld; the principle of a distinction between the west and east in southern Scotland and northern England (Piggott's Solway-Clyde and Tyne-Forth Provinces) was maintained; and Hawkes' (1961) Western Province was likewise adhered to. The southern boundary is largely artificial in the west, but to the east it matches that chosen by Hawkes (*ibid*) to distinguish between his Eastern and Southern provinces. The present scheme differs from the Hawkes Model in central Britain where the Pennines play a larger role in defining boundaries between regions.

Site Types

Sites were divided into the categories of: *Unenclosed*; *Simple Enclosure*; and *Elaborate Enclosure*. This is very much an experimental categorisation but was thought to be potentially more useful for a social interpretation than factors involved in enclosure shape (typology-influenced and topography-based); location (again topography-dependent); or construction materials/techniques (often location-dependent). Such categorisation was also simple and flexible enough to accommodate the inevitable variations in settlement archaeology across such a wide study area. 'Simple enclosure' includes enclosures of all types (palisades, ditched, bank-and-ditched, stone walls and uni-vallate hilltop enclosures) which have a single unit of enclosure. 'Elaborate enclosure' includes those which have more than one unit of enclosure (double palisade, bank-and-ditch or wall and bi- and multi-vallate hilltop enclosures) and settlements with elaborate systems of linear earthworks. 'Unenclosed' includes the traditional unenclosed houses - eg unenclosed platform settlements - and also 'open' settlement.

Finds

In recent years the relative importance of finds has been underplayed in non-specialist accounts (Haselgrove *et al.* 2001) but finds have an unparalleled role in giving us information on past activities, a crucial tool in the interpretation of structure function. Finds used in the study are those from contexts which are securely associated with the structure. Topsoil finds have therefore been excluded despite the fact that they may originally have been associated with structure use. Even when an object is deposited in a 'ritual' context (i.e. structured deposition) it may still be an indicator of functional activity on site *at some stage* in the object's history. As such one artefact – for example the adze deposited in a pit under the structure at South Shields – can potentially tell us something about on-site activity in a functional sense as well as provide information regarding ritual practice. Finds were divided into six main categories: *Subsistence*;

Textile Production; Metalworking; Craftworking; Display; and Other. Below is information regarding what find types were included in each category:

Subsistence Finds

Vessels (ceramics, oak bowl, stone cup), discs and lids (often perforated slate, stone discs)
Fine ware (Samian, Belgic and Gaulish ware, glassware, flagons, amphorae)
VCP/briquetage
Bone and teeth
Shell and fish bones
Plant remains
Querns, mortars, rubbers and pounders
Pot-boilers
Hazelnuts, arrowheads, 'slingstones', bird-catching gorges

Textile Production

Spindlewhorls (stone, clay, antler and jet)
Clay loomweights, bone and antler weaving combs
Bone needles

Metalworking

Furnaces, tuyères, ores, coke/cinder/fuel ash
Anvilstones, forges, debris/hammerscale
Unidentified iron slag
Crucibles, moulds, moulding sand

Craftworking

Worked flints and working debris (includes chert, pitchstone, quartz and jasper)
Worked bone/antler and working debris
Worked cannel coal/slate and working debris
Glass moulds, slag, rods
Tools (hammerstones, bill-hooks, 'bars', boulder working surfaces etc)
Whetstones/Hones
Other (iron fragments, lumps of quartz, lead and haematite, weights etc)

Display

Clothes fasteners (brooches, pins, buttons/toggles)
Jewellery (armlets [shale/jet/lignite, glass, oak, iron, copper alloy], rings [shale/lignite, bone, iron], pendants [jet/lignite, glass], beads [glass, jet/lignite, amber])
Coins
Weapons (spears, swords, bosses)
Prestige (Roman imports i.e. tableware, amphorae, glassware etc in LrIA contexts (marked as possible when in LrIA-ERIA and RIA contexts), decorative fittings [bronze thong tags, discs and straps], toilet equipment, horse gear, stone figurine, jasper ball, decorated bone drum, bronze axe fragment)

Other

Lamps (includes flint strike-a-light)
Fixtures and fittings (iron nails, window glass, fragments of tile)
Cup-marked stones
Holed stones (includes 'hollowed' and 'perforated' stones)
Games and curios (gaming pieces, a quartz 'head', horn whistle, incised bone)
Deposited bone
Other (a horse/ox shoe, hobnails, rectangular iron plate)

Fineware is included in both 'subsistence' and 'display' categories, as it has a functional role as well as one of prestige, especially in pRIA contexts. The idea of foreign goods as always prestige goods is theoretically flawed (Hunter forthcoming) but an alternative approach has not been sought as the topic impacts only slightly on this study. The non-acceptance of foreign goods may be to do with factors of dissention/resistance or even, more simply, distaste. A community who rejects foreign goods, however, becomes recorded, by default, as low status. Likewise those who accept foreign goods are considered high status. This is especially true for the LrIA-ERIA transition when foreign goods again become very visible. Whilst simplistic, the concept of status indicators is used all too often, as it is an easy way to get what appears to be social information from, in reality, very complex data. A more sophisticated, integrated approach to our assemblages is now needed.

Slingstones have been put into the 'Subsistence' category as evidence for hunting, despite the possibility that they could also be used in warfare. Direct evidence for warfare on domestic sites is somewhat limited in the study area. The interpretation of beach pebbles as evidence for sling warfare is heavily inspired by reference to the classical texts and by analogy with southern sites where such stones are found in association with 'defensive' architecture. There is also the possibility that 'slingstones' have been misinterpreted in earlier accounts and are actually pot-boilers. When all the evidence was considered, the 'Subsistence' category was deemed by far the 'safest' category in which to put them. In order to try and extract information on both formation processes and human action, finds were categorised in two additional ways: formation context and spatial context (see below). *Formation Context* gives some indication of when and under what circumstances an artefact became incorporated in the record and *Spatial Context* potentially provides information regarding use of space and deposition practices.

Formation Context

'Constructed deposition' (foundation deposits, wall/bank material [includes stone finds in rubble], W-S/Ph packing, R-D infill, niches)

Structural feature fills (W-S, C-R phs)

Non-structural feature fills (pits, phs, D-Gs)

Horizontal interfaces (floor surfaces, yards, subsoil, platform scoops)

Use deposits (occupation and hearth deposits, wear depression fills, rock fissure fills)

Decay deposits (post-abandonment levels)

Spatial Context

O Wall (SWs, W-S fills etc.)

Terminals (D-G, W-S and entrance phs)

C-R phs

Internal (phs, pits, floor, occupation soil etc)

Hearth deposits

External contexts (D-G [non-terminal deposition], external hearths, pits, yards, middens, annexes etc.)

Structure Function

Finds were used alongside other evidence to provide an indication of structure function (see 6.4). The aim was to see which categories were most commonly found together and which activities remained segregated. It was found impossible to separate out rubbers from pounders because so few reports provide this level of detail on their coarse stone tools. As a result, pounders remain in the 'storage/preparation' category when they should strictly be under the category of 'domestic' because of their role in food preparation. Internal partitions and pits were not used to help determine structure function as they were considered to be undiagnostic. The following explains what types of evidence were used for each category:

Domestic.

Subsistence finds: all vessels, bone and shell, pot-boilers and evidence for food procurement

Short-term storage (recesses/niches)

Games

Occupation deposits

Hearths/cooking-pits

Seating/beds

Byres

Excavator interpretation

Extensive wear (deep W-Gs and R-Ds) and trampling

Internal drains

Offset/'guiding' entrances

Grain Storage/Preparation

Excavator interpretation

Subsistence finds: querns; rubbers and pounders

Carbonised grain

Textile Production

Finds: spindlewhorls, loomweights, weaving combs and needles

Metalworking

Furnaces

Finds: waste products, tools etc

Workshops

Finds: worked flint, bone/antler and cannel coal, tools, hones

Working surfaces

3.1.5 Analysis and Interpretation

Data

At the outset, a decision was made to present all data as percentages of the whole rather than as real numbers. The latter can be misleading; use of percentages means that data in different groups becomes comparable, despite numerical biases. It was decided to present as much data as

possible in graph form to allow the reader to confirm statements made in the text. Graphs were generated in Microsoft Excel and imported into CorelDraw for presentation. There are four levels to data analysis: general numerical trends; chronological trends; regional trends; and relationships between variables. For example, 'structure area' is primarily considered using the whole dataset; it is examined chronologically; also regionally; and finally it is plotted against any other variable which may prove interesting, for example: structure area vs. height above sea level. Some variables, however, are unsuited to all four levels of analysis. The dataset has the potential to be broken down to a regional-chronological level but factors of time meant that a further level of analysis was impractical. For some topics, however, further division of limited data would greatly increase the risk of distortion.

At no point has the data consciously been forced into an interpretative model; rather the approach has been to remain as objective as possible throughout. The aim was simply to reveal any patterns inherent in the data by presenting all of the data as numerical, chronological and regional graphs. Analysis and interpretation were deliberately kept as wide-ranging as possible and the study remained holistic at all times. An interdisciplinary approach to interpretation of results takes in research from the fields of ethnography, experimental archaeology, structural engineering, and wood microbiology in addition to more theoretical fields such as social theory. Tables 3.2-3.3 provide a summary of the main ethnographic and experimental literature consulted as part of the study. Where experimental constructs are referred to in the text they are in italics.

Tribe	Country	Reference
Dorze	W Ethiopia	Gebremedhin 1971
Pokomo	E Kenya	Andersen 1978
Zulu	South Africa	Biermann 1971
Galla	S Ethiopia	Andersen 1978
Kamba	E Kenya	Andersen 1978
Sidamo	W Ethiopia	Gebremedhin 1971
baKosi	W Cameroon	Levin 1971
Kipsigis	SW Kenya	Peristiany 1939; Orchardson & Matson 1961; Andersen 1978; Oliver 1987
Kuria	N Tanzania	Andersen 1978
Pokot	W Kenya	Andersen 1978
Mongols	C Ethiopia	Oliver 1987; Mears 1998
Nandi	W Kenya	Andersen 1978
Gurage	Mongolia	Gebremedhin 1971
Luo	W Kenya	Andersen 1978
Tswana	Botswana	Schapera 1984; Oliver 1987; Larsson 1989
Pokot	W Kenya	Andersen 1978
Various	Malawi	Mthawanji 1971
Gala	C Ethiopia	Gebremedhin 1971
Luyia	W Kenya	Andersen 1978
Kikuyu	C Kenya	Andersen 1978

Table 3.2 Main ethnographic examples of circular architecture used in the study

House	Site	References
Balksbury	Little Butser	Reynolds 1979; 1988
Breiddin	Avoncroft Museum	Reynolds 1988
Castell Henllys 1982	Castell Henllys	Mytum 1986
Castell Henllys 1998	Castell Henllys	Bennett 2001; pers. comm.
Conderton 1	Avoncroft Museum	Reynolds 1983; forthcoming
Conderton 2	Museum of Welsh Life	Reynolds forthcoming; D. Price pers. comm.
Danebury	?Little Butser	Reynolds 1988
Glastonbury 1	Bredon Hill	Reynolds 1967
Glastonbury 2	Butser	R. Hedge pers. comm.
Glastonbury 3	Butser	R. Hedge pers. comm.
Greenbogs	Archaeolink, Oyne	Murray forthcoming; pers. comm.
Longbridge Deverill Cow Down	Butser	R. Hedge pers. comm.
Maiden Castle	Little Butser	Reynolds 1979; 1988
MBA Houses	Cornwall Celtic Village	Wood 1995
Moel y Gaer 1	?Little Butser	Reynolds 1988
Moel y Gaer 2	?Little Butser	Reynolds 1988
Moel y Gaer 3	Museum of Welsh Life	Reynolds forthcoming; D. Price pers. comm.
Moel y Gerddi 1	Museum of Welsh Life	Reynolds forthcoming; D. Price pers. comm.
Moel y Gerddi 2	Butser	R. Hedge pers. comm.
Pimperne	Little Butser	Reynolds 1983; 1988; 1993
Turf House	Little Butser	Reynolds 1979

Table 3.3 Main experimental reconstructions used in the study

Finds

Table 3.4 reveals how finds incorporation is linked to the life-cycle of a structure. By way of example, it is currently understood that finds in structural feature fills are likely to be as a result of structure use (Reynolds 1995), this is not however conclusive and finds may just as easily have been deposited on construction; or have become incorporated during salvage activities. At present, few reports consider detailed questions of taphonomy, further complicating use analyses. The vast majority of finds are secondary refuse and for this reason contextual studies are naturally flawed. There are also the manifold problems of residuality in finds incorporation, as well as the complication of off-site disposal. An analysis was also undertaken to see what types of find were more or less likely to occur in certain contexts. The idea was that this might help identify which types of find were involved in ritual deposition practices. Appendix 3 gives the data available on finds type and context in the dataset. The categories of 'sewing equipment'; 'lamps'; 'deposited bone' and 'other finds' were excluded from the analysis as the number of instances for each of these categories was under ten and it was decided that as such these were not reliable. Any finds type which was found to be 10% or more above or below the average percentage was recorded as anomalous. The results of this analysis are shown in table 3.5. Appendix 4 is a record of the incidences of 'odd deposits' in the dataset. 'Odd deposits' are those non-functional deposits – according to modern functionalist principles – those most readily identifiable as being involved in ritual deposition practices.

	Construction	Use	Abandonment	Post-Abandonment
Constructed Deposits	****	*	*	*
Structural Feature Fills	**	***	**	**
Non-Structural Feature Fills	***	***	***	**
Horizontal Interface	*	***	****	***
Hearth	**	***	***	**
Occupation Soil	*	*	***	****
**** Certain *** Likely ** Possible * Unlikely				

Table 3.4 Finds incorporation by context according to structure life-cycle

	Less than Average	More than Average
Constructed Deposition	VCP; Arrowheads; Worked Bone/Antler; Smithing Debris	Holed Stones; Games/Curios (cup-marked stones); Coins
Structural Feature Fills	Clothes Fasteners; Fixtures/Fittings; Fineware & Prestige Goods	Smithing Debris; VCP; Cup-Marked Stones; Plant Remains
Non-Structural Feature Fills	Games/Curios; Fixtures/Fittings; Shell; Spindlewhorls	Plant Remains; Smithing Debris; Fineware; Smelting Debris; Clothes Fasteners
Horizontal Interface	Plant Remains	Fixtures/Fittings; Games/Curios; Hones; Craftworking Equipment; Jewellery; Prestige Goods
Hearth	Data Not Suitable	None
Occupation Deposits	Data Not Suitable	None
Decay Deposits	Data Not Suitable	None

Table 3.5 Above and below average incidence of finds type according to context

3.2 Data Quality

A number of factors were encountered during data collection which ultimately had a direct impact on the quality of the dataset. The first is obviously archaeological survival and the various factors which result in the truncation of features and the disturbance of deposits. Following this are problems encountered during the excavation process, as well as the post-excavation problems of interpretation, including those of dating/phasing and the interpretation of roundhouse features by non-specialists. Problems were also encountered as a result of the variability in standards of publication. Each of these aspects were found to significantly alter the quality of the evidence and it was decided that as this was the case, these factors should be discussed as a way of providing a background to the dataset.

3.2.1 The Surviving Record

The survival of archaeological deposits was considered as one way of determining the quality of the data. It was found that that 66% of central-rings were incomplete and 24% of structures survived as an arc, or even less. Factors encountered include the various problems of animal and floral interaction; those of erosion - in particular forward erosion of platforms on slopes (cf. Piggott 1948-49; Musson *et al.* 1991); robbing (both modern and in antiquity); loss through

quarrying, in particular gravel extraction; and truncation as a result of subsequent occupation or field clearance and ploughing, both ancient – e.g. Lairg CS2 – and modern – through both agricultural and forestry activities. It is the latter of these, plough damage, that is usually cited as the reason for poor survival of features and deposits (e.g. Guilbert 1981) and fig. 3.5 confirms that plough damage is the most common damage type, being recorded at over one third of sites. Plough damage to the interior of settlements has been recorded at a fairly consistent 0.30 m depth (Triscott 1982; Heslop 1987; Haselgrove *et al.* 1990) – although up to 0.50 m of loss was recorded at the site of Melville Nurseries in Midlothian (Raisen & Rees 1994-95) – and has been blamed for loss of structural evidence on prehistoric settlement sites (Jobey 1973a; Guilbert 1975b). However, it is only when plough damage and erosion are considered *together* (fig. 3.6) that we become aware of how site-specific the effects of ploughing really are.

In valley locations, erosion is low and soil accumulation means that archaeological deposits may survive the plough; for example at Fisherwick 3 in Staffordshire where topsoil was recorded as being 0.40 m deep (Smith 1979). At hilltop/ridge locations, whilst almost half of sites suffer from erosion, few sites are ploughed. It is settlements on ploughed lower slopes which are those most likely to suffer truncation or loss of archaeological deposits, where natural processes of erosion mean that soils are thin and the archaeology lies closer to the surface. Ploughing of these sites results in real damage. Jobey's (1973a) consideration of CS 12 and CS 20 at Hartburn in Northumberland revealed that wall-slot depth is directly related to the depth of the overlying soil with greater soil depth protecting features from truncation so that on a slope, deposits and features were more likely to survive downslope (fig. 3.7).

When depth of feature was plotted against plough damage, the depth of outer wall and C-R postholes on plough damaged sites actually proved to be slightly *greater* than those on non-plough-damaged sites (fig. 3.8). This evidence suggests that, in fact, plough damage is, on the whole, not a *major* factor in the survival of archaeological features in north and central Britain, even despite the fact that plough damage *is* the factor most responsible for site damage. This may be explained by the fact that the majority (69%) of prehistoric settlements in the dataset are located above the 100 m contour (52% are above 150 m), whilst the majority (60%) of plough damage is recorded below this level (84% is recorded below 150 m).

3.2.2 Excavation and Interpretation

The Excavation Process

Survival is just the first hurdle for the archaeological record, numerous problems associated with the excavation process also affect data quality. A poor excavation strategy limits successful

interpretation, for example the use of slip trenches or sondages, using inexperienced diggers (students and volunteers), poor recording and the unrecorded activities of enthusiastic antiquarians. Evidence from Catcote in Cleveland (Long 1988), Mam Tor in Derbyshire (Coombs & Thompson 1979), Ronaldsway Village on the Isle of Man (Higgins 1999) and Tre'r Ceiri in Gwynedd (Hogg 1960), in particular, have suffered from various combinations of the above factors.

Recognition of patterns on site is difficult when a palimpsest of features is encountered (e.g. Ironhill CS 1) and/or when a structure extends beyond the confines of the excavated area. Other problems encountered are the effects of weather on colour distinctions in some subsoils, for example, in dry sand (Jobey 1973a). Another problem is the difficulty of digging waterlogged clay (Britnell *et al.* 1989). Guilbert (1975b) considers December-February to be the best time to dig clay subsoils, a time when few excavations take place. Difficult soils mean that sometimes structural features escape detection. Particularly difficult is the recognition of small stakeholes, especially in mixed or stony subsoils (Watkins 1982; Crew 1998) or when fills differ only slightly in colour/texture from that through which or into which they are cut (Kendrick 1995).

Interpretation

Dating and Phasing

Residuality is a typical problem in multi-phase/multi-period settlements, for example at the Breiddin in Powys (Musson *et al.* 1991). Regarding C-14 dates, the less-preferred but often-used method of taking bulk samples of charcoal from non-sealed contexts (e.g. Raisen & Rees 1994-95) means that some dates may be derived from residual charcoal. The 'abraded condition' of charcoal samples from Beckton Farm in Dumfries & Galloway (Pollard 1997) is one example of this problem. C-14 dates from wood charcoal are notoriously unreliable for close-dating of contexts and dating of seeds revealed that a discrepancy of c. 100-200 years is common (van der Veen 1992). At Kilphedir in Sutherland, different laboratories returned different dates for the same sample, revealing the "lack of absolute precision inherent in the method" (Fairhurst & Taylor 1970-71, 90). Van der Veen stresses the importance of understanding taphonomic processes when using C-14 dates (Holbrook & van der Veen 1995), which too few reports can claim to have. The problems of inaccuracy aside, the fact is that C-14 dating – unlike dendrochronology – is incapable of providing the precision dating which more detailed studies require (cf. Barber & Crone forthcoming; Halliday forthcoming).

Interpretation of Features

Secondly, there is the misinterpretation of features, in particular the confusion inherent in determining whether a circular gully functioned as a wall-slot or a drainage-gully. Possibly one of the main problems in site reports is the misinterpretation of gully features and therefore of structural details. Some believe that if a gully doesn't show evidence for postholes then it is safe to interpret it as a drainage gully (J. May pers. comm.; Magilton 1980). In fact, the majority of wall-slots are actually *without* evidence for posts: the presence/absence of evidence for timber uprights alone is not a safe method for interpreting gully function. As a result, a more secure scheme was devised in order to help distinguish wall-slots from drainage-gully features. There are five checks which will help distinguish a W-S from a D-G, these are gully width, width of entrance gap, gully profile, fill type, and provision of run-off gullies:

1. *Gully Width*: The mean width of a drainage-gully is 0.75 m (77% are > 0.40 m wide) whilst the mean width of a wall-slot is 0.32 m (75% are < 0.40 m wide).
2. *Width of Entrance Gap*: Average doorway width is 1.52 m, whilst in D-Gs, the average width of the entrance gap is 4.0 m with 84% > 2.5 m wide.
3. *Gully Profile*: D-Gs tend to be V- or U-shaped whilst wall-slots are more likely to have flat bases and straight sides.
4. *Fill Type*: Probably the best indicator but one often lacking in site reports. 87% of D-Gs reveal silty material as their primary fill, whilst 79% of wall-slot fills consist of dark friable loams, often with traces of daub or occupation material.
5. *Run-off Gullies*: A final check - particularly useful for sites constructed on boulder clay - is for the provision of linear run-off gullies, these are linked to a D-G and direct water away from it in a radial fashion.

Structural Evidence

Lastly we have the problem of determining whether the structural evidence as represented archaeologically, is *complete*. In recording the structures, I had to be sure that a structure described as a S-R had originally *been* a S-R structure, a single ring of postholes (likely to be recorded as a S-R) could be all that survived, or all that was excavated, of a D-R structure (Guilbert 1981). With this in mind, several factors were taken into consideration on the recording of structures: the degree of damage and archaeological survival; the proportion of the structure that had been excavated; the quality of published plans and the selective illustration of postholes. Also, when interpreting poorly preserved structures it is important to see whether a particular construction technique may be demonstrated better elsewhere on the same site – perhaps because of differential survival - this could then be used in the interpretation of the former.

Another problem involved with structural interpretation is deciding whether all of the features associated *with* a structure are necessarily part *of* the structure, in other words, the problem of the 'Bersu principle'. Bersu was, without doubt, the leading figure in roundhouse excavation and interpretation in the mid-20th century. His excavations, of Little Woodbury (1940) and Scotstarvit Covert (1947-48) in particular, have been highly influential regarding interpretation of structure plans – for example, the 'large circular house' at Dinorben (Savory 1959) which the current author rejects. Unfortunately, Bersu was targeting what he saw as the big buildings of the aristocracy and in his desire to prove the great size of these structures, he sacrifices attention to detail (cf. Evans 1998).

Bersu's interpretation of the Manx structures (Bersu 1977) cannot be supported when subjected to heavy scrutiny. Similarly, Piggott's total roofing of the Milton Loch site (Piggott 1952-53) is now open to question. Scotstarvit Covert (Bersu 1947-48a) Phases I & II - interpreted by Bersu as T-Rs with a maximum diameter of *c.* 20 m – might be reinterpreted as D-Rs surrounded by an enclosing fence, with Bersu's *inner*-ring as the *outer* wall. This is supported by the presence of a doorpost in the entrance of Ph.I's I-R – a similar feature can be found at Dryburn Bridge, CS1 (Triscott 1982) – also the use of a W-S for Bersu's I-R implies continuous walling: a feature uncommon except in an outer wall context. Simply because concentric rings of posts are associated with one another, need not mean that they are all structural.

3.2.3 Evidence Quality

A basic scheme was devised to determine data quality. 'Good Quality' evidence provides good evidence for the outer wall, all structural elements and the doorway. Evidence quality is considered to be 'Fair' when there is good information for two of the above three elements. 'Poor Quality' evidence is when evidence for these elements is limited or lacking. Using this scheme, only 27% of data can be considered to be good quality with 35% fair; and 38% poor. In a similar way, 6% of structures couldn't be classified structurally as the excavated/survival information was just too poor. Of the remaining structures, only 78% are classified confidently, with 22% being classified with slightly more caution. It was decided to use both in analysis, however, as the methods used to allot structural type were consistent, the results are relative and as such are still useful.

From the 1950s onwards larger-scale excavations began to take place and there was a vast increase in the number of structures excavated per site (fig. 3.9). Eight of the nine sites labelled as 'distorters' for the purposes of this study (see 3.1.2) were excavated between 1964 and 1998. Between them, these eight sites alone account for 56% of the published structures excavated between 1950 and 1999 and demonstrate the move towards open-area excavation - eg Moel y

Gaer in Flintshire (Guilbert 1975b; 1976) - as well as the role of rescue excavation - eg Hartburn in Northumberland (Jobey 1973a) - in the later 20th century. Alongside this trend, however, the amount of 'poor quality' data has also increased through time (fig. 3.10). It is believed that this reflects the more recent excavation of less well-preserved lowland structures in large-scale projects ahead of development, as opposed to the earlier targeting of well-preserved upland examples. It also reveals the trend towards interim publishing in periodicals such as *Discovery and Excavation in Scotland* prior to the production of a full excavation report.

Part of determining evidence quality is being aware of just how much data is lost to the 'unknown' category. Figs 3.11-3.12 reveal the percentage of unknown data in each category. The mean figure for unknown data is 35%. Areas with a figure greater than the average were: doorway width; drainage-gully depth, fill, width of entrance gap, and distance from wall; depth of doorframe, porch, outer wall and C-R postholes; outer wall stakehole and wall-slot depth; provision of packing in C-R postholes; SW construction details and bulk wall height; provision of internal divisions; hearth type and hearth position. These areas are therefore a cause for concern. Other than doorway width and the provision of internal divisions – which are likely to be a result of poor survival – this is clearly a result of poor recording or inadequate publication.

Consistently bad is the data for feature depth, with an average 70% of data as unknown, compared to an average 14% for feature width. This can be explained by the fact that where a plan is produced – a standard recording procedure – feature width can be taken from that; unless feature depth is recorded *in the field* – a task often forgotten in recording – then that information is lost. Apart from width, drainage-gullies are exceptionally poorly described, with an average 72% of data as unknown. Perhaps as function is already ascribed to these features, it is felt that full description is unnecessary. This may also explain the lack of description of bulk walls (stone and mass walling); it is perhaps felt that a 'wall' with an apparently obvious function needs only a minimum of recording or description.

44% of hearths are of unknown type, this may be explained by the fact that in many cases all the evidence that remains is a patch of scorched subsoil. Less understandable is that 40% of hearths are of unknown position within the structure, with many hearths that are alluded to in the text being unmarked on the plan. This means that evidence for spatial arrangements within structures is not as strong as it could be. Similarly, 32% of finds are of unknown context; again hindering spatial analyses.

Reports can also limit the evidence for a site in other ways. Selective plans or details – see for example Cocroft *et al.*'s (1989) discussion of early excavation at Castle Ditch in Cheshire – mean that full interpretation is hindered. Interim publishing too, whilst useful in some respects,

can mean a site becomes misinterpreted as a result of limited information – for example, compare Smith (1980) with Smith & Taylor (2000). Enderby II in Leicestershire is a better example where good plans more than compensate for brief descriptions (Sharman & Clay 1991; Meek 1997). It is clear that when the excavator fully understands the excavation process, a good excavation is followed up with a thorough report (e.g. Kelly 1988; Beamish 1998). Having discussed methods employed in the study and given a brief outline of data quality, attention will now turn to prehistoric circular structures.

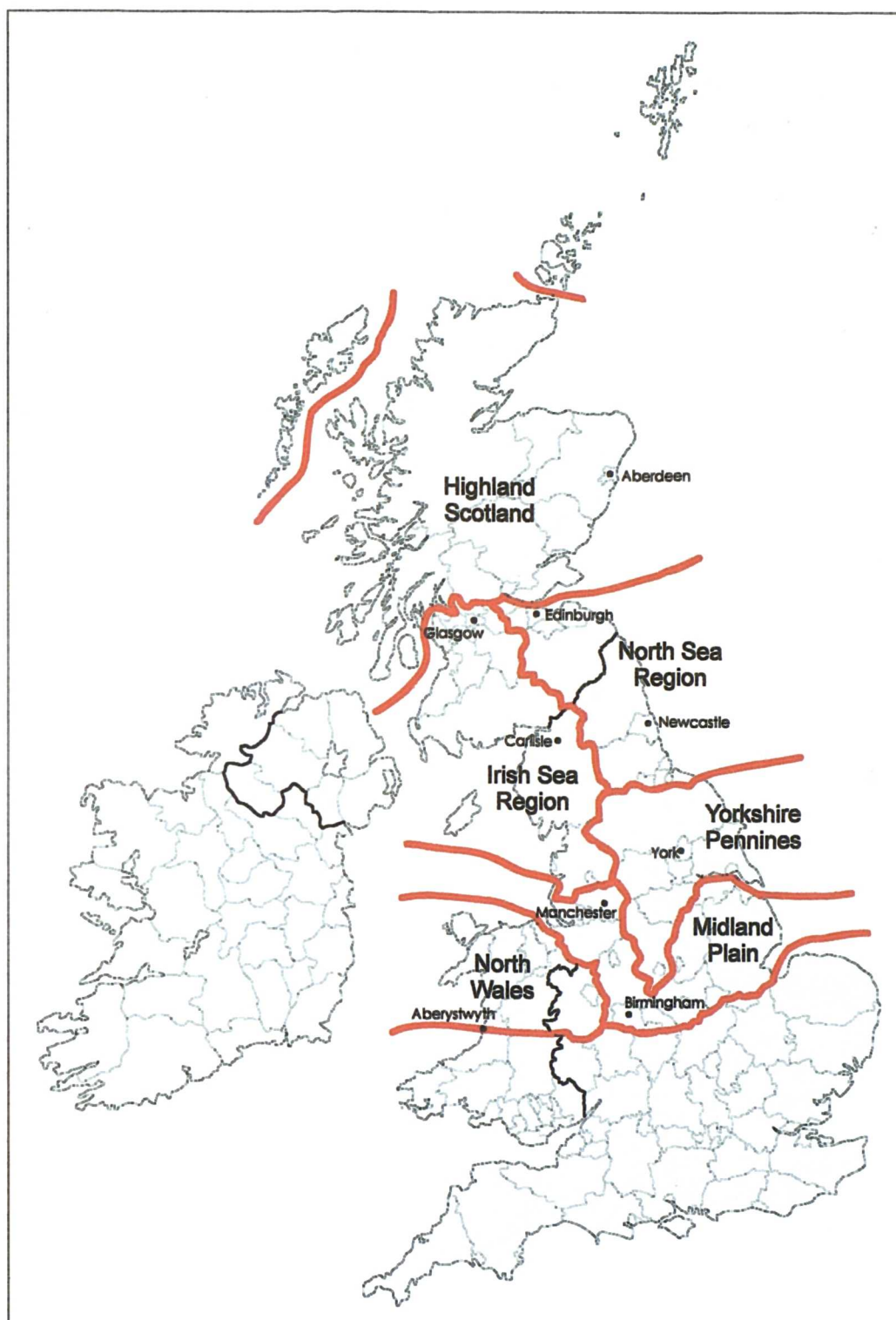
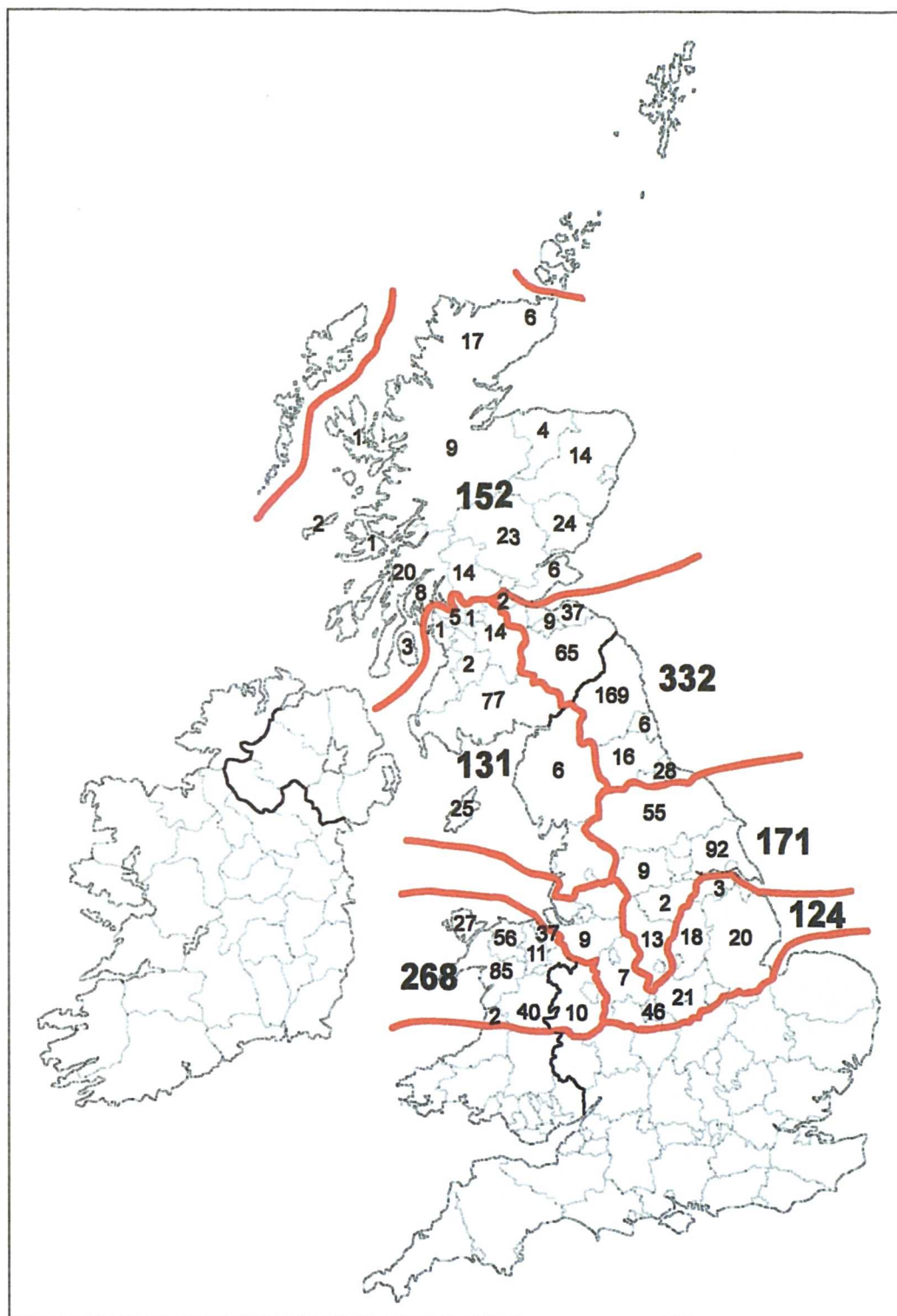


Fig 3.1 Definition of regions used in the study



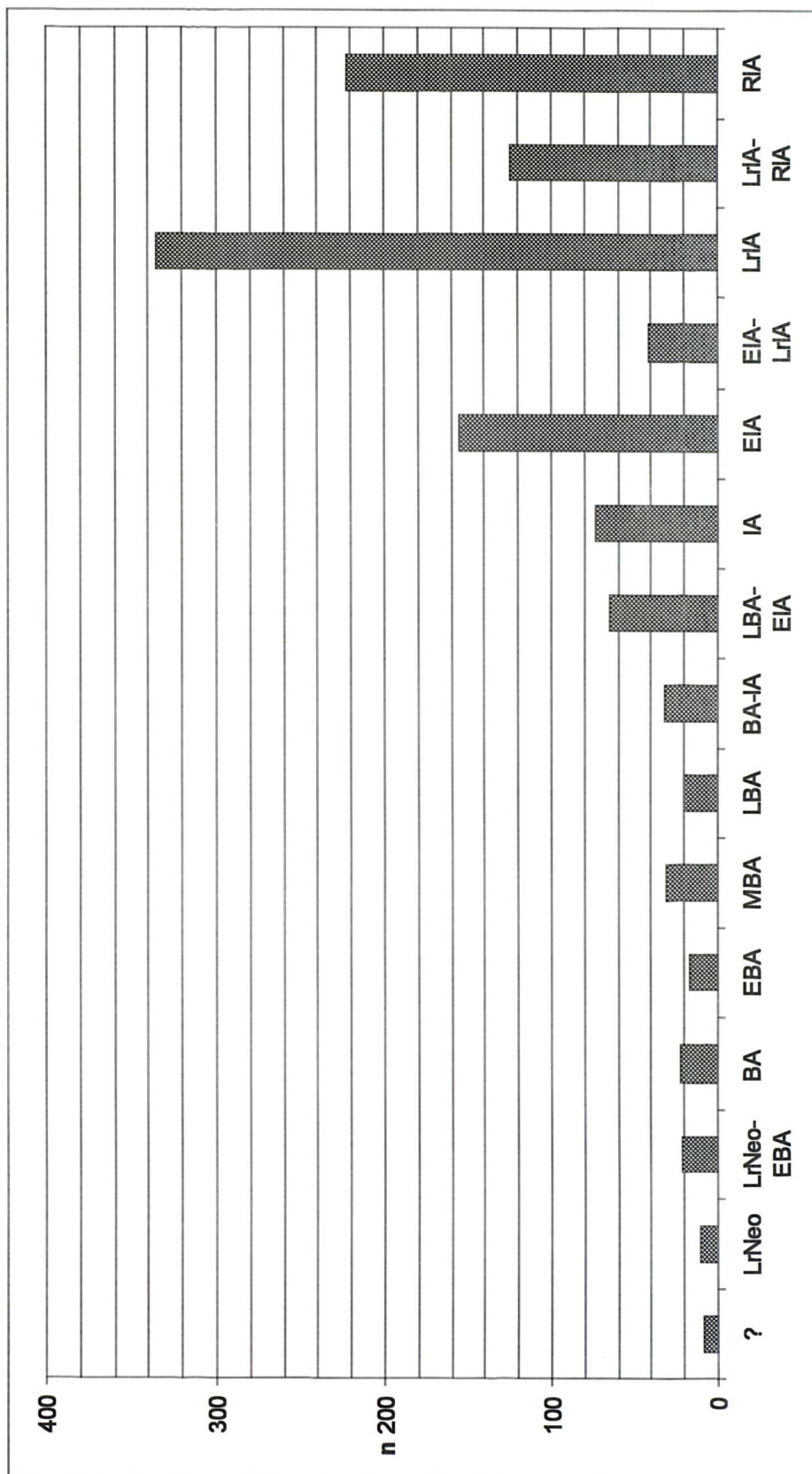


Fig 3.3 Chronological breakdown of the dataset

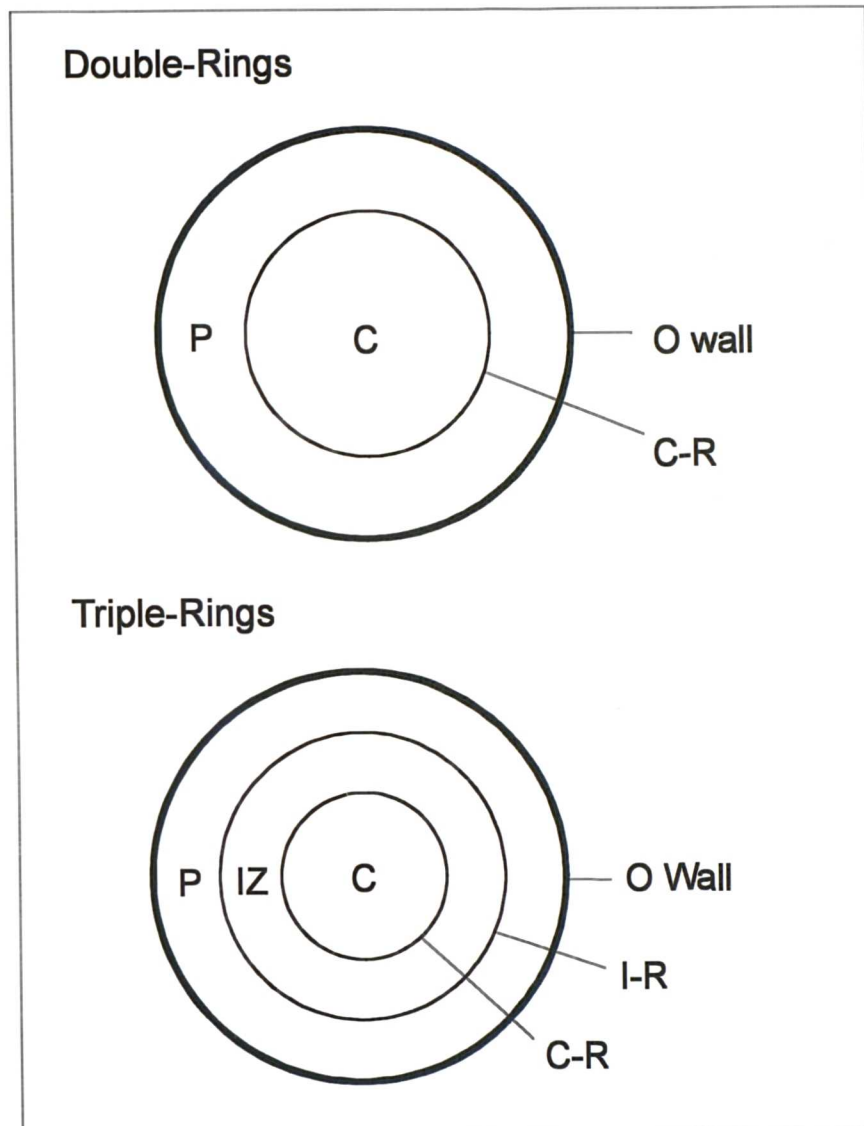


Fig 3.4 Structural units and spatial zones

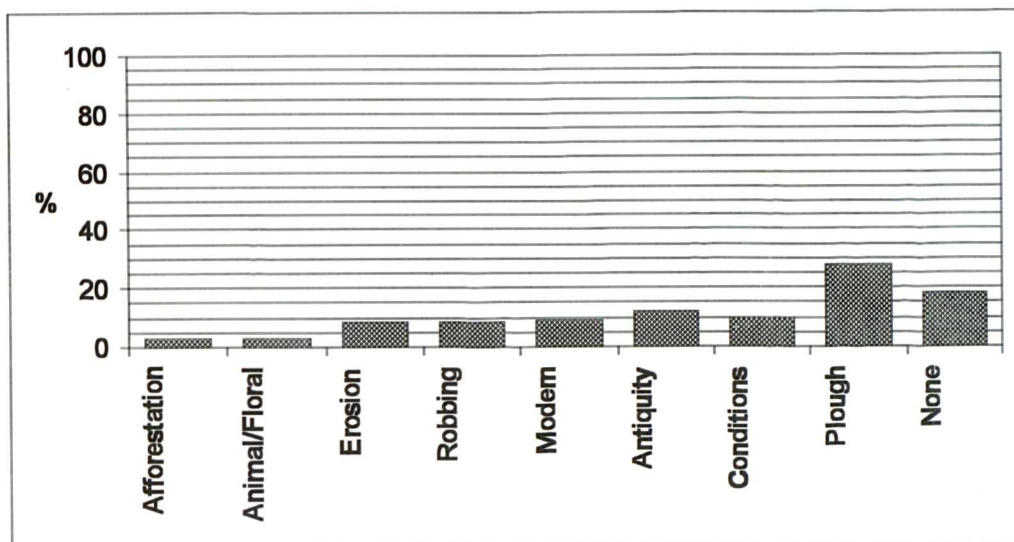


Fig 3.5 Damage type

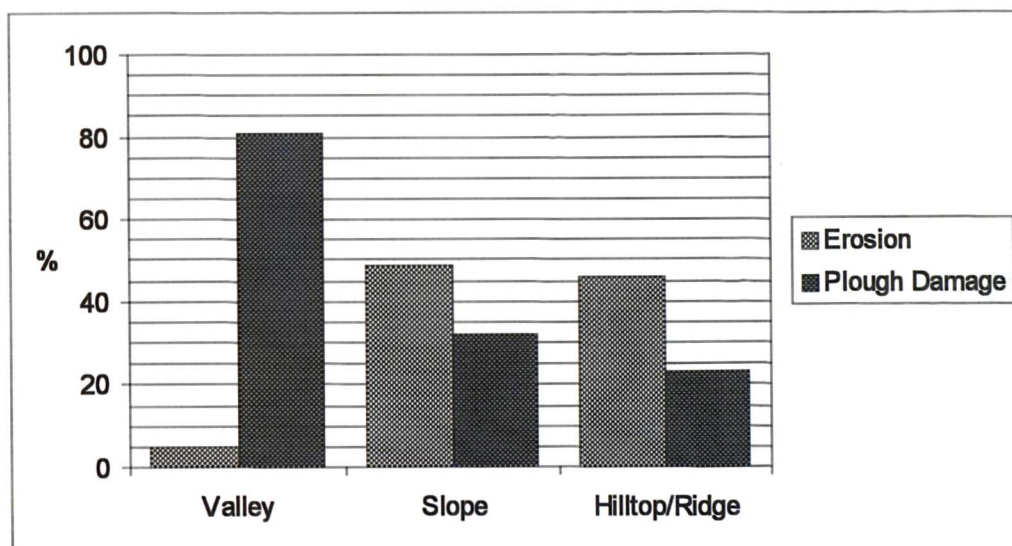


Fig 3.6 Damage and location

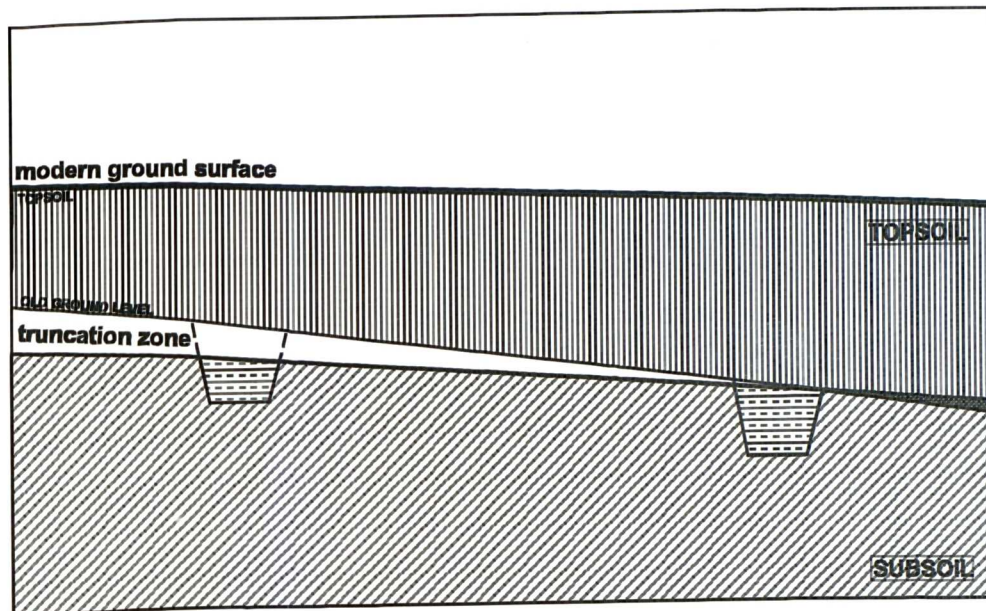


Fig 3.7 Plough damage on slopes

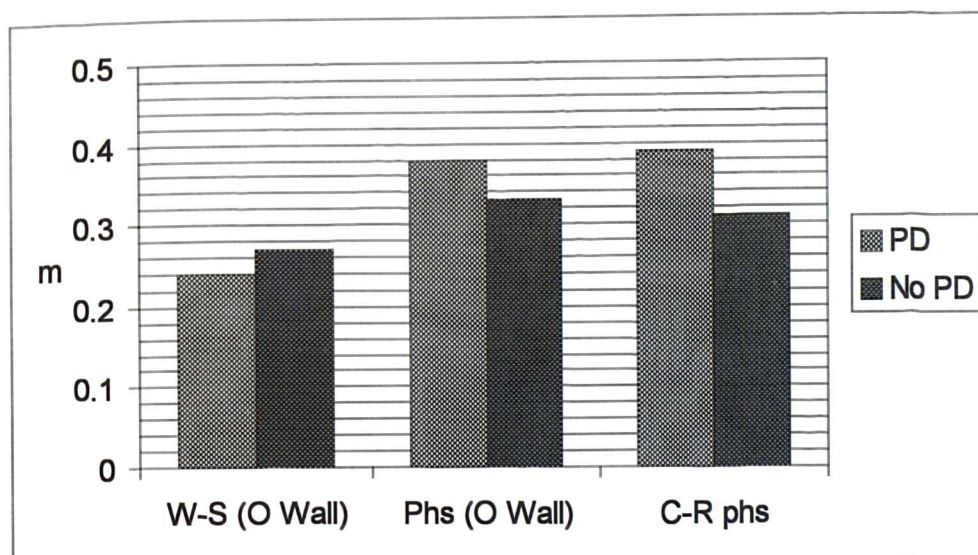


Fig 3.8 Plough damage and mean feature depth

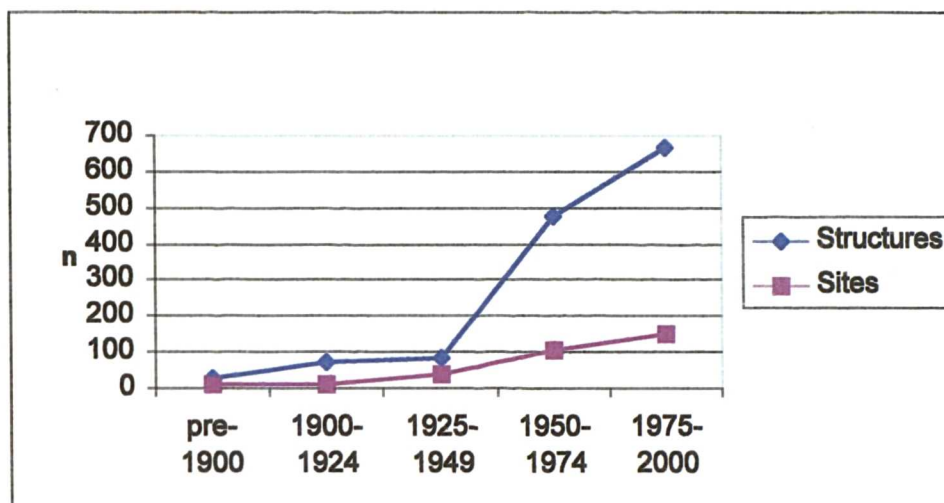


Fig 3.9 The growth in number of structures excavated per site

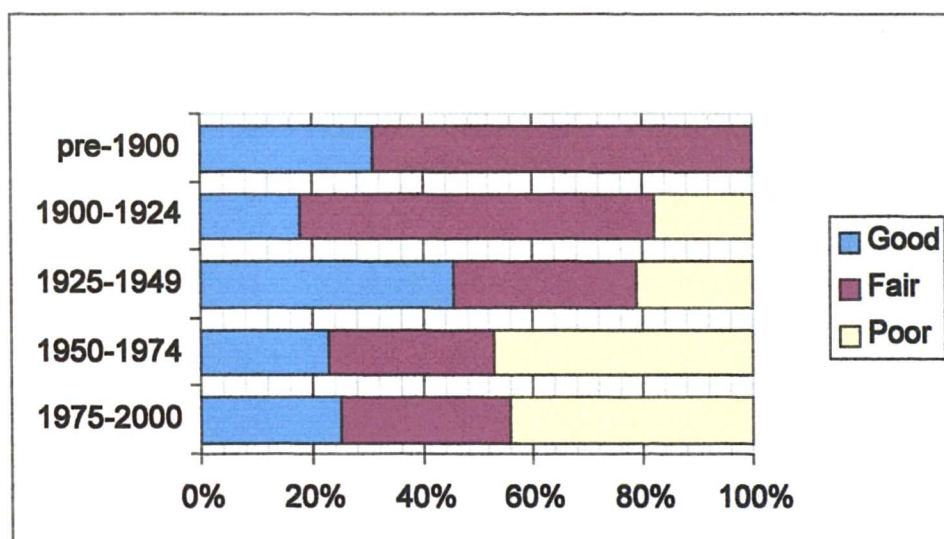


Fig 3.10 The growth of poor quality data

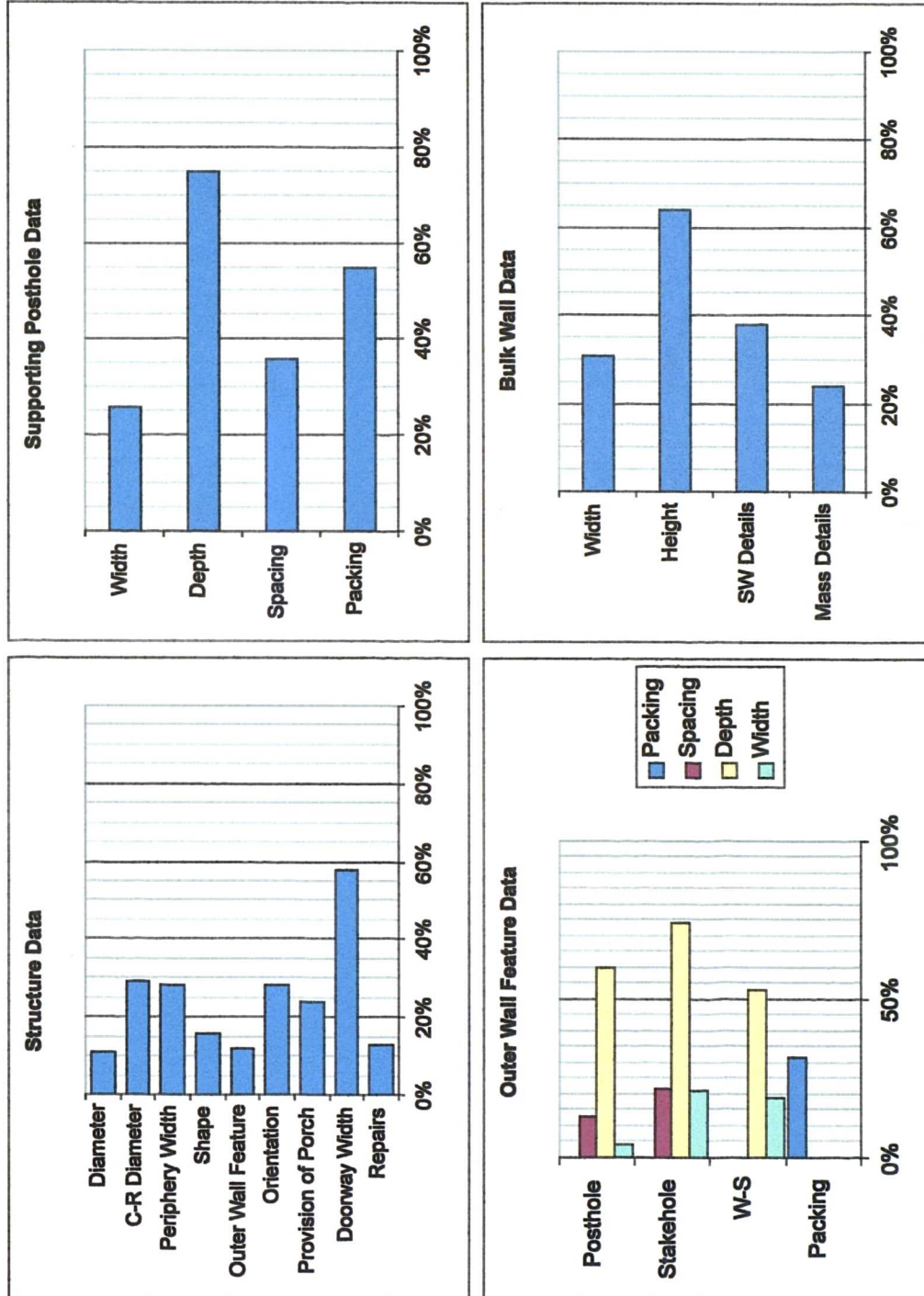


Fig 3.11 Percentage of structural data in the 'unknown' category

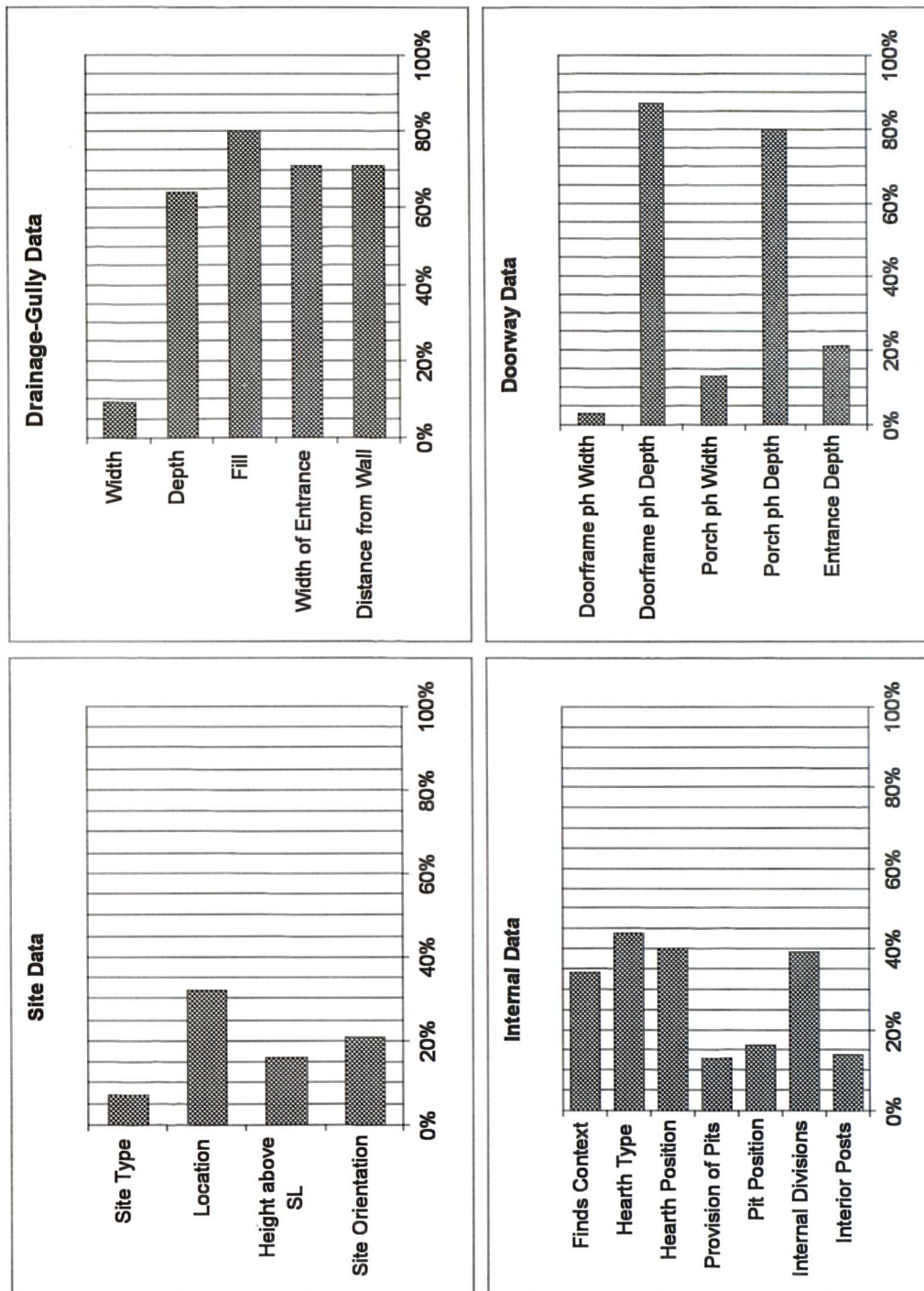


Fig 3.12 Percentage of non-structural data in the 'unknown' category

Chapter 4 Design

"structures can be treated as cultural fossils in the same way as portable artefacts"

(Guilbert 1976, 316)

4.1 Introduction

This chapter serves as an introduction to circular architecture by looking at structure design. Beginning with a discussion of the design process, we move on to circular structure types and the various design features as they exist in the record. Following this is a discussion of size and shape. The second section looks at the main structural principles at work in circular architecture: structural engineering, the 'optimum ratio', post-ring symmetry, and the process of 'overbuilding'. Finally, the discussion brings together the main chronological and regional trends regarding structure design.

4.2 Structure Design

The *design* of circular structures is rarely considered in prehistoric archaeology and their builders rarely thought of as architects. This is arguably a result of the traditional equation of prehistoric society with primitive society (cf. Kuper 1988). Third World societies too are traditionally regarded as primitive and these provide roundhouse studies with our closest analogue (cf. Biermann 1971, 96). Traditional architecture – both modern and prehistoric - has often been regarded as uncomplicated, basic, and of low status (cf. Bourdier & Alsayyad 1989). Now that archaeology is beginning to move on from foundational notions of progressive development we can instead recognise that societies that are different from our own are not necessarily any less 'civilised' as such; they simply use different technologies. This section discusses the various elements involved in the design of the circular structure: a form which survived across Britain for in the order of one hundred and fifty generations.

4.2.1 The Design Process

How can we begin to understand the processes behind such a long-lived tradition? We will begin with a consideration of the design process from the ethnographic literature. In most traditional African communities, rather than architectural design being the preserve of a specialist, every person is instead an architect (Levin 1971, 143). Our inability to understand such a system is highlighted by the comments of a traditional Ethiopian architect. When asked by an ethnographer how house construction could possibly take place without plans he replied: "plans are only for those who don't know what they are doing" (Gebremedhin 1971, 120). In

traditional African societies house design is held as communal knowledge and passed down through the generations³. This system results in the 'cultural ownership' of house design. As such it is a factor which tends to remain 'traditional' and the ethnographic literature indicates that, in general, even in the face of political and economic changes, house styles tend to remain constant (Denyer 1978, 159).

It has been argued that the main factor working against innovation in house design is this dependency on tradition (Oliver 1989, 56). We might begin to understand this principle more fully when we begin to identify the mechanisms through which a society reproduces itself (cf. Giddens 1984). The key lies in the education of children - a notion repeatedly seized upon by political extremists throughout modern history. Through instruction and correction, children - who are naturally receptive - are taught on a daily basis not only how to behave but also how to think. Through oral tradition and the repetition of daily tasks children learn what is 'acceptable' within their culture. As a result, normative behavioural patterns are bound up with emotional 'rules of conduct' involving notions of heritage, tradition, and the benefits of cumulative knowledge. In time, the average child actually begins to define his or her *self* according to these beliefs. As such, reproducing cultural norms works to reinforce a *personal* sense of ontological security. As a result there is an innate desire within every society to resist change (Cunliffe 1991, 523).

Before we begin to focus on the constraining qualities of house design we must remember to consider the impact of both 'agency' and 'fashion'. Both of these factors have a role in modifying tradition. Agency means that, despite the *general* trend towards the reproduction of society, the actions of the agent - whether deliberate or otherwise; directly or indirectly - changes the status quo (see fig. 2.2). Secondly there is the role of 'fashion' which might be considered, on the whole, to be a universal human characteristic. Creativity, emulation, experimentation: these things do appear to be driven by a natural desire for (synthetic) change. As such it appears that we have two co-existing structures in human societies: the pull of tradition and the push of innovation. One factor that is often tied in with this is community 'isolation' (Oliver 1989, 56): a heavily connected community - often confronted with alternative ideas - is potentially more receptive to change; an isolated community - whose cultural traditions are less frequently challenged - less so. Whilst house design is on the whole insensitive to wider social changes, the ethnographic literature does reveal that when change in house style *does* occur it can be either gradual or sudden (Denyer 1978, 159).

³ The role of oral tradition should not be underestimated in prehistoric studies. By way of example, the current author's maternal grandmother passed down stories which have since been corroborated by her daughter's genealogical research. Some of the stories were found to stretch back at least 300 years.

So how does a new idea take hold? How do things change? The traditional explanation regarding the spread of technology involves the concept of 'diffusion': the steady spread of an idea across space and through time. The problem with this idea is that it assumes an artificial uniformity which gives no credit to cultural traditions or the active agent. As an alternative to diffusionism, researchers in the US have turned to the natural sciences and a principle known as the *small worlds network* (Watts 1999; Buchanan 2002). For example, I know 'x'; and x's friend 'y' knows celebrity 'z'. A piece of information could spread from me to celebrity z relatively quickly even though no direct contact is made between us⁴. The main point that the *small worlds network* makes clear is that time and space can no longer be seen as constraining factors regarding the transfer of ideas. Ideas can spread both rapidly (relatively speaking) and geographically erratically. This is because the transfer of ideas depends on contact between *individuals*. As such, it is driven by any factor which brings people together: kinship, friendship, trade contacts, population movement, warfare, travel etc. The transfer of an idea is also dependent on the degree of receptiveness of each encountered community (fig. 4.1).

In traditional African societies – and similarly in the archaeological record - house design reveals a high degree of local variation. It is perhaps useful to see the emergence of a particular style as a fusion of ideas: both traditional and innovative after contact between a number of communities (Denyer 1978, 159). There is also the idea that rather than moving from design to materials the prehistoric builder gathered materials with the general concept in mind and the design itself is organic depending on the quantity and quality of materials available and the nature of the site (Inman *et al.* 1985). But why the circle? It has been suggested that the circle provides the easiest way of setting out a house, less exacting than the rectangle (Andersen 1978; Guilbert 1976). It is also a highly robust form responding well to the forces of gravity with its ability to evenly redistribute the load of the roof. The circular shape transfers the thrust of the roof into horizontal form around its circular form before transfer to the ground. Reynolds states that the roundhouse is virtually the perfect design: powerful in that stresses are contained within the shape, and ultimately all the thrust is exerted vertically (Reynolds 1993, 94). Its design absorbs the impact of the wind effectively as, unlike a rectangular structure, at no point does it present a flat side to the wind (Reynolds 1979, 35). The roof is also perfectly designed for the run-off of rain. It can be argued that the use of the circular structure in later prehistory was a result of the development from the simpler, design-related structures of early prehistory (see below).

⁴ The idea has recently been harnessed by advertising agencies. Referred to as 'viral marketing', it relies on news of a product spreading by word of mouth amongst members of a target market group.

4.2.2 House Type

Made famous by Bersu's interpretation of Little Woodbury in Jacquetta Hawkes' 1944 film (Hawkes 1946) and later by Peter Reynolds' numerous reconstructions, the traditional interpretation of the Iron Age roundhouse is as a *cone-and-cylinder* type structure. We cannot be *sure* however - from substructure alone - that this is necessarily the case. The *cone-and-cylinder* type is only one of six house types which would all leave a similar archaeological signature. Using evidence from ethnography and previous work on traditional architecture, five others will also be considered and the case put for each. Circular house types can be divided into two broad categories: 'tent' structures - those without a wall - and walled structures.

'Tent' Structures (figs 4.2-4.4)

Dome (Cipriani 3; Denyer 4)

A dome is formed by bending saplings and 'planting' them in the ground at both ends. The structure is constructed under tension but soon plastic deformation of the bent timbers takes place, stresses decrease and the structure becomes a stable unit. Young trees, less than around 0.10 m in diameter, are flexible enough to perform the task in hand. Turning to the prehistoric data, just 8% of those timber outer wall features with good enough data are of sapling size but the majority of these consist of apparently vertical stakeholes. The nature of the dome means that it is of limited size but unfortunately dimensions are rarely given in the ethnographic literature. The dome structure is not suited to wet climates. It necessitates an abundance of thatching material and so predominates in uncultivated grasslands (Biermann 1971, 103).

Wigwam (Cipriani 1; Denyer 5)

The wigwam has a greater potential diameter than the dome type. Rather than a sapling being planted at both ends each sapling remains straight, one end is planted and the other is tied at the apex. The diameter is therefore potentially doubled. The wigwam has few stresses as it is not created under tension. The fact that the foot of the upright is planted in the ground prevents it from moving outwards under pressure from the weight of the thatch. Alternatively, these structures may be covered with skins. Perhaps in the milder climate of the mid-late 3rd millennium BC (Petit *et al.* 1999) such house types could have been utilised as short-term, seasonal residences. The evidence, however, is limited although angled postholes exist at Totternhoe, Bedfordshire and Danebury CS 13 (Burgess 1980, 230; Cunliffe 1984, 58). In some instances the frame is slightly concave, forming what can be called a 'trumpet' shape. The disadvantage of the wigwam is that by using rigid elements it minimises volume as headroom is restricted in the structure's periphery. Of the three shapes of tent, the wigwam - or cone - is the best in terms of aerodynamics as it offers least resistance to the wind (Reynolds 1988, 8).

***Beehive* (Cipriani 2; Denyer 2 & 6)**

Like the wigwam, saplings are tied at the apex giving a greater potential diameter than the dome. However, rather than using rigid elements, a convex shape is created, thus maximising volume and increasing headroom in the structure's periphery. The beehive shape is created under tension but, as with the dome, plastic deformation occurs and stresses decrease over time. The self-supporting *chencha* structure of the Dorze (western Ethiopia) has an average diameter of 7-8 m (Gcbremedhin 1971). It has been tentatively suggested that some of our stake-built structures may be of this type (cf. Musson 1970, 274; Burgess 1980, 230) and more recent accounts have been more confident in their assertions (Cunliffe & Poole 1991a; Bareham 2002). However it has also been argued that beehive structures would be undesirable in later prehistory because of their small size and their lack of resistance to a temperate climate (Reynolds 1993, 94). A handful of examples from across Britain now attest to their use in the Mesolithic.

Walled Structures (figs 4.3-4.4)

Dome-and-Cylinder

Like the dome structure, the nature of the roof in a dome-and-cylinder structure limits its potential size. The addition of a wall, however, increases the enclosed volume by maximising headroom in the structure's periphery. No examples of this type have been found in the ethnographic literature. As such, whilst technically possible, the type remains hypothetical. It is assumed that the decision to provide a wall represents the need for increased space; limiting that space via the use of a dome roof is therefore seen to contradict the original aim. It has been argued that dome-shaped roofs - because of their small size and the fact that they leak horribly - would have been a perverse choice in prehistoric Britain (Reynolds forthcoming, 219). The Roman author Strabo does however describe the houses of the Gauls as having dome-shaped thatched roofs (*Geography* 4, IV, 3). Perhaps he was describing the dome-like roof of the beehive-and-cylinder structure.

***Beehive-and-Cylinder* (Denyer 3)**

Some prehistoric structures may have been of the *beehive-and-cylinder* type, like the traditional Kipsigis house of south-west Kenya (cf. Orchardson & Matson 1961). Rather than straight rafters resting on the wall to form a cone - slender rafters are driven into the ground in between the wall posts. These are then bent from the top of the wall and held together at the apex to form a flat dome. The eaves are constructed as a separate feature. The structure has the shouldered appearance of the *dome* but the distinction between roof and wall make it architecturally transitional between the *dome* and the *cone-and-cylinder* type. The type greatly increases the volume of the structure but because the roof timbers are planted in the ground, size remains

limited. Another design problem is the ineffectiveness of the dome shape in a temperate climate and in addition the 'weak-spot' created by the separate eaves. We might still envisage some of our earlier structures - perhaps those of the drier sub-Boreal climate of the 2nd millennium BC - as of this type.

Cone-and-Cylinder (Denyer 1 & 3; also 7 & 8 but in developed form)

The cone-and-cylinder is by far the most popular house type in African traditional architecture (cf. Denyer 1978, 133-135). The cone-and-cylinder dispenses with the beehive-and-cylinder's separate eaves. By using rigid elements, joined at the apex to form a cone, a neat angle is formed which provides effective run-off: the cone is thus structurally simple, strong, and functional. In addition, the versatility of the cone allows for the addition of roof supports and a much greater potential diameter than any of the other house types. In typological terms the cone-and-cylinder is the most developed circular house type (fig. 4.5). It maximises diameter, volume, functionality, and versatility. In some examples, as with the wigwam type, a slightly concave cone is created. This is known as a 'trumpet' style roof.

Fig. 4.5 is not meant to be read as a traditional typology. Instead it is a graphic representation of architectural solutions to a number of design problems inherent in circular architecture. It is to be thought of as operating at the household/community level. It is not to be seen as a model of progressive development. Circular architecture, for example, did not 'start' with the dome. In fact it is the wigwam which is potentially the most influential form. Equally a particular type may have been bypassed in the design process. Development can take place in *either* direction, for example a type can become too *big* for a household's needs as well as too small. In addition, a community might use a different architectural type for a different function; for example a walled structure for the domestic base, and a 'tent' structure for occupation during seasonal farming activities. An intermediate stage for all forms may be the transition from a circular to an oval shape or vice versa. Increasing the ovality of a structure is one way of increasing house size without reverting to a change in house type (Walton 1952, 139). There are also numerous architectural embellishments to the basic types as witnessed in the ethnographic literature (e.g. fig. 4.3).

4.2.3 House Design

In this study 'house design' is used to refer to the structure as defined by its outer wall: namely the choice of materials and of construction techniques. Whilst this is to some extent determined by the availability of materials, tools, landscape location, geology etc. this subdivision was deemed necessary for the purposes of analysis. One in ten structures – from twenty-five sites – have no evidence for the nature of their outer wall. In these cases an internal post-ring or

penannular drainage-gully is the only archaeological evidence for the site of a house. Stone walls may have been robbed. It has been suggested that such structures may have been constructed using sill-beams (Reid 1993). Alternatively, the outer wall may have suffered from slope erosion or been lost to plough damage. Where location was known, all but three of the above sites were positioned on the lower slopes but only twelve were recorded as being plough damaged. Alternatively, they may have been mass walls such as turf or daub which have left no archaeological trace. Some decayed turf was found in the ring-ditch at Ironshill (Pollock 1997) and daub walling has been suggested at Thorpe Thewles (Heslop 1987).

Timber Walls

Timber-Built

Wall-slots provide the most common house remains (39% of those known). It has been suggested that digging a continuous wall-slot is much easier, in hard geologies, than digging separate post-holes - especially if using a wooden spade - as the initial ground-breaking episode need only occur once (Hansen 1959; Harding 1974). Similarly, antler picks - eg those from Dinorben (Gardner & Savory 1964, fig 26; Savory 1971, fig 14) - are better designed for excavating a continuous wall-slot rather than the individual posthole. One in three wall-slots has evidence for spaced uprights in the form of timber impressions. Almost three in four are posts, whilst one in four are stakes. This may confirm Hansen's (1959) idea regarding the early wall-slot as a solution to limited digging technology. For example, at Danebury, the early stake-built structures are set in wall-slots but by the 3rd C BC - in line with the ubiquity of iron - this technique has been superseded by that of 'barring' the individual hole (Reid 1993, 55). What of the two in three wall-slot structures without evidence for uprights?

Is it simply a matter of survival? The impression of an upright presumably only survives where it was driven or hammered into the ground through the wall-slot. Otherwise it is identified through the arrangement of packing stones. Simply setting an upright into the wall-slot without hammering it into the solid ground; or packing it round with earth rather than with stone seriously compromises the lateral stability of the upright in a non-contiguous wall. This stability is needed if collapse is to be avoided upon the addition of the wall-plate and main rafters. It might be assumed then that a wall-slot which lacks evidence for spaced uprights may represent the use of contiguous uprights. Previous researchers certainly believed this to be the case (cf. Jobey 1962; 1973b; 1978; Jobey & Tait 1966; Burgess 1980, 230). If so, then around one in five (22%) structures in the dataset had contiguous timber walls. Conclusive evidence, however, is rare. Just sixteen structures had contiguous timber impressions. A square profile was recorded in 5% of wall-slots which might suggest the use of planking or contiguous squared posts. Alternatively, following Reid (1993), it may be possible that some wall-slots provide a

foundation for sill-beams. Such a feature would need to be polygonal in shape. Fourteen structures had a polygonal wall-slot however this might equally be indicative of the use of prefabricated hurdles.

Post-Rings

14% of circular structures survive as a post-ring. Additional evidence from wall-slot structures reveal that at least one in five (21%) structures were post-built. But do these post-rings represent the outer wall? Has a more ephemeral wall been ploughed out or missed in excavation/interpretation, leaving only the *internal* post-ring in the archaeological record (cf. Avery & Close-Brooks 1969; Guilbert 1981)? After the work of Guilbert (1981) non-specialists may be too keen to 'jump on the bandwagon' by believing that a post-ring *cannot* represent the outer wall of a structure. As Guilbert himself states this is simply not the case (1981, 310). Where only a post-ring survives, the archaeologist must use many factors to guide interpretation. Issues such as plough damage and erosion must be considered and a full study made of the surviving structural features involving depth, spacing etc.

One way of determining the function of a post-ring is to analyse the spacing of the posts. Wall posts tend to be more closely spaced (averaging *c.* 1.7 m) than internal posts (average *c.* 2 m). The spacing of posts at Shearplace Hill CS A (*c.* 1.1 m) - for example - suggests that the post-ring *is* actually the outer wall of the structure after all (contra Avery & Close-Brooks 1969; contra Musson 1970)⁵. In this scenario the very slight outer groove (see Guilbert 1981) could instead be seen as the remains of an encircling hurdle fence. At Little Woodbury House I and also at Longbridge Deverill Cow Down, the spacing of the posts of the inner post-ring (*c.* 1.2 m and *c.* 1.3 m respectively) may suggest that in these cases the post-ring was actually the outer wall of the structure (fig. 4.6) as suggested for Longbridge Deverill (Chadwick Hawkes 1994). The outer post-ring may instead be seen as an encircling fence (see also 4.2.4).

Stake-Rings

Only 3% of structures in the dataset survive as a stake-ring. Additional evidence from wall-slot structures suggests that around one in sixteen structures (6%) were stake-built. There is evidence to suggest that even this 6% figure is too high. Reynolds successfully roofed stake-built simple-ring structures up to 5.5 m in diameter when bedded in a wall-slot (Reynolds 1988, 18). The 9.5 m *Moel y Gerddi House* (Museum of Welsh Life) – with wall-slot and internal post-ring - is still sound today after ten years (Dai Price pers. comm.). However the 6.8 m *Moel y Gaer 3 House* – a stake-walled double-ring *without* a wall-slot – is failing after ten years as the stake-walls have begun to spring out at the entrance under the weight of the roof (Dai Price pers.

⁵ The current author does accept the general principle advanced by both Avery and Close-Brooks (1969) and Musson (1970), simply not for the example of Shearplace Hill.

comm.). Attempts at building stake-walled structures without either wall-slot or internal post-ring were even less successful. The 7.5 m *Moel y Gaer 2 House* (Little Butser) was never thatched and Reynolds was unable to roof the *Danebury House* – an 8 m diameter stake-walled simple-ring – as the stake walls were incapable of sustaining the thrust of the roof (Reynolds 1988, 18). A 6.5 m diameter stake-walled simple-ring at Castell Henllys seems to be more successful (Bennett 2001). The average diameter of the stake-built structures at Danebury is 7 m, Cunliffe & Poole (1991) have interpreted them as of beehive-and-cylinder type (fig. 4.7) and the idea has caught on (cf. Barcham 2002)

Three out of four stake-walled structures are simple-rings and 56% of these are more than 7 m in diameter. In light of the above it is perhaps difficult to see these structures as being roofed. Reynolds (1988) suggests that they were perhaps animal compounds. Another alternative is that they represent enclosed working areas. At 1 in 3 sites, stake-walled structures are associated with metalworking debris: both iron and non-ferrous. A stake-walled simple-ring was reconstructed as a smithy at Castell Henllys because of its association with metalworking debris (Bennett 2001). At Bryn y Castell and Crawcwellt West in Gwynedd (fig. 4.8) such deposits are in apparently primary contexts on the floor (Crew 1985; 1998). Domestic material is particularly rare in stake-built simple-ring types and is usually in non-use contexts. Stake-built simple-rings may also have functioned as 'mortuary houses'. At Gardom's Edge (Peak District) a stake-built simple-ring, with blocked entrance, contained a central cremation and an inverted saddle quern (B. Bevan pers. comm.). It has been suggested that these structures may house a body prior to cremation (A. Fitzpatrick pers. comm.) and this would certainly accord well with their presence under barrows (cf. Ashbee 1959). It is interesting that a number of stake-walled structures in northern Britain are found in upland locations: two in five sites with stake-built circular structures are above 275 m OD and it is possible that some are the remains of wattle-lined turf ring-banks.

The literature states that stake-built, turf- or daub-filled cavity walls were widespread in the Bronze Age, for example at Green Knowe (Scottish Borders) and Gwithian in Cornwall (Burgess 1980, 230). Such a technique is rare in the ethnographic literature, bar the traditional Kikuyu house of the central Kenyan highlands (Andersen 1978, 83). Excavations have failed to reveal further clear prehistoric examples, although the idea of the 'cavity wall' has recently been given renewed consideration regarding the LrNeo-EBA structures at Lintshie Gutter in Lanarkshire (Terry 1995a, 422). Feachem's 'cavity walls'⁶ at Green Knowe have since been interpreted as two successive stake-walled structures (Jobey 1978-80; Guilbert 1981, 314). The same might be suggested for the cavity-walled structure recently argued for at Coldean Lane

⁶ The term was first used by Jobey (1978-80). Feachem actually referred to them as "[turf or stone] walls screened on both faces" (1960-61, 84).

(Bareham 2002). A further and preferable alternative is that the remains at both sites were of turf-built structures, of which only the inner face was wattle-lined (see below). What we may have in the stake-ring is a versatile, short-term device which was only occasionally used as the wall to a roofed structure - presumably because of its naturally short lifespan. More often a stake-ring was utilised as a 'shelter' for short-term activities or as the wattle-lining for a turf or stone wall or scarp face.

Mass Walls

Stone Walls

26% of structures survive as a stone wall. The low height of stone walls has been commented on again and again by their excavators. Robbing is naturally a problem in interpreting these remains however thirteen have a wall which suggests that it might originally have been the stone foundation for a turf superstructure as originally suggested by Curle (1909-10) at Bonchester Hill and by Thorneycroft (1932-33) at Dalrulzion. In these examples the wall is of one course and is lower than 0.30 m. Around one in four structures (25%) can be said to be the remains of a fully stone-walled structure. Whilst the majority of these walls are generally relatively low, some are several courses high.

Ring-Banks

Ring-banks make up just 8% of structures. One in five are of unknown type but *c.* 2% of circular structures had evidence for turf walls. Evidence from low foundation walls suggests that a further *c.* 1% of structures could be of this type. Less than 1% of structures had evidence for a clay or daub wall. Around 1% of structures are stone ring-banks: a low, dump construction bulk wall. A further *c.* 2% are made of earth (turf?) and stone: e.g. Kilphedir CS 1 (Fairhurst & Taylor 1970-71, 71) and Lairg CS 6 (McCullagh & Tipping 1998, 104-6). The type is particularly recognised in the Bronze Age north (Reid 1989, 17; Burgess 1980; Hill 1984; Reid 1993). The type is undoubtedly popular in the Bronze Age but has also many earlier and later examples, into even the RIA. Of 80 mass-walled structures, nine revealed evidence for a wattle lining; roughly the same number of stone walls – again of any period - are also wattle-lined. As some ring-banks enclose a post-ring (e.g. Milking Gap) it has been suggested that they are a variant of the double-ring roundhouse (Reid 1989, 18). This is however misleading as ring-banks of all structural types are known. The current author sees them as short-term structures as hinted at by Jobey (1978-80, 94).

The interpretations of Green Knowe and Moel y Gaer are linked. Following Feachem (1960-61), Guilbert initially suggested the possibility of turf walls for the post-ring roundhouses at Moel y Gaer (1976, 308). By 1981, however, he preferred Jobey's (1978-80) interpretation with

the slight outer feature as a timber wall. Similarly Hill (1984) followed Jobey but comments that – at both Moel y Gaer and Green Knowe – the wall-slot and post-ring are closer together than might be expected. This fact, combined with the slight nature of the outer wall feature, led Hill (1984) to conclude that at these sites the wall was not structurally important. Reid (1989), however, follows Feachem and interprets the Green Knowe structures as ring-banks. In fact the Green Knowe 'wall-slots' are quite narrow – as little as 0.18 m wide – giving an impression of substance only on Platform 2 where phases 2 and 3 converge (fig. 4.9). They are also of below average depth. If these narrow features were instead the gully for an internal wattle-lining to an archaeologically invisible turf wall this would explain their slight nature⁷. It would also explain their close proximity to the post-ring as the thrust of the roof would be absorbed further out by the mass wall.

Was the 'field clearance' on Green Knowe Plat. 2 actually the stone foundation for the latest phase of turf wall? The profile does show a level area just over 2 m wide above the scarp (fig. 4.9). The same is true for Standrop Rigg CS 2 (fig. 4.10). At Danebury, a rubble layer concentric with and external to the timber feature at CS 36 and CSs 38-39 may have had a similar purpose (Cunliffe & Poole 1991). Similarly at Moel y Gaer, Guilbert's projected wall-line can be seen as the inner face of a turf wall, which in some cases is wattle-lined. Other structures may have been without lining or else the very slight feature was not preserved. The 'porches' of the double-rings at c. 1.5 m wide, might reveal the width of the turf wall (figs 4.11-4.12). The average width of a turf wall is 1.4 m. Are Guilbert's 'lost' outer walls actually of turf? At Danebury, the, again very slight, timber features are seen as the wall of the structure and the hollows, in which they sit, are interpreted as wear depressions. Yet the stake-ring is generally positioned *inside* the break of slope (fig. 4.13). Fig. 4.14 presents an alternative interpretation for the Danebury structures which sees the stake-ring as non-structural wattle, screening off a mass wall of turf and/or natural. Might some of our apparently stake-walled double-rings also be re-interpreted in this light?

Of the nine stake-built double-rings in the dataset, two had uncommonly narrow peripheries. These were Standrop Rigg CS 2 and Beckton Farm CS 111. At Standrop Rigg, the clearance stones – which were presumably thrown against the structure in the post-abandonment phase (the stones do not respect the ?ESE entrance) appear to have negatively preserved the line of a turf wall up to the rear scarp (fig. 4.10). Taking post-collapse tumble into account it would appear that Standrop Rigg CS 2 originally had a 1.2 m wide turf wall. Beckton Farm is more difficult to interpret not least because the plan stops short of where a turf wall might be expected to extend. Jobey (1983) did remark that the Standrop stake walls were not load-bearing and preferred to see them as wattle screens. Similarly, at Danebury CSs 14-15 'obscure' features at

⁷ See for example Jill Kendrick's (1995) reconstruction drawing of a Douglasmuir house.

the entrance defied interpretation (fig. 4.15). They can, however, be seen as preserving the line of an 1.8 m wide turf wall. It is possible that any structure with a slight outer wall feature may be potentially interpreted in the same way⁸. In this light, the stake-built simple-rings at Moel y Gaer are a prime candidate for re-interpretation and the failure, after just ten years, of the *Moel y Gaer House* at the Museum of Welsh Life may well be symptomatic.

4.2.4 Size

The size of prehistoric circular structures range from as little as 2 m in (internal) diameter (Dubby Sike West) to as much as 19 m (Aldclune 2). However, such extremes are rare and 90% of structures are between 4 m and 12 m in diameter (fig. 4.16). The average diameter of the prehistoric circular structure is 7.9 m and shifts according to wall type (fig. 4.17). A problem in roundhouse studies has been the perceived dichotomy between the large (*c.* 13-15 m diameter) roundhouses - such as Little Woodbury - and smaller structures of under *c.* 8 m in diameter. This has its roots in the early evolutionary typologies which saw development from small BA houses to larger, increasingly 'civilised' IA types. The work of Avery & Close-Brooks (1969), Musson (1970) and Guilbert (1981) has, however, served to increase the size of many of the smaller post-ring structures. This study might also serve to decrease the size of some of our more imaginatively large houses.

Simple-Ring Structures

62% of the dataset are simple-ring structures (fig. 4.18). A simple-ring relies on the load-bearing capacity of its wall and thus its size is limited accordingly. Simple-ring structures generally have a diameter of 9 m and below. Structures with a diameter of 6 m or less are most likely to be of simple-ring type due to the crossover of types at between 7-9 m. Most simple-rings are between 3-9 m in diameter (fig. 4.20). Castell Henllys CS 3, however, was reconstructed as an 11 m simple-ring (Mytum 1999). Further experimental reconstruction at Castell Henllys has shown that a simple-ring structure can be as large as 13 m if ring-beam technology is employed and scaffolding is used during construction (Bennett 2001; see also Clay 1992, 21). Table 4.1 reveals that stone- and mass-walled simple-rings are more likely to be smaller than their timber-built counterparts (see also fig 4.20). This is because these wall-types are naturally less stable on construction without internal supports and a smaller size moves to increase the strength of the structure and hence its durability.

⁸ A number of factors must be taken into consideration however and ideally a specialist should be used for their interpretation.



	Simple-Ring	Double-Ring	Triple-Ring
Ring-Bank	c. 3-9 m	c. 7-9 m	c. 11-12 m
Stone Wall	c. 3-9 m	c. 8-10 m	c. 16 m
Wall Slot	c. 4-9 m	c. 8-11 m	c. 12-16 m
Post Wall	c. 4-9 m	c. 7-11 m	c. 10-12 m

Table 4.1 Range in diameters according to wall type and structural type

Double-Ring Structures

34% of the dataset are double-ring structures (fig. 4.18). A double-ring uses an internal post-ring to redistribute the load of the roof during construction. No longer reliant solely on the load-bearing capacity of the outer wall, size (and hence roof weight) can be increased. Double-rings are generally 7 m and more in diameter (fig. 4.20). Those with a diameter of 10 m and above are most likely to be of double-ring type due to the crossover of types at between 7-9 m. Most double-ring structures are between 7-11 m in diameter (contra Reid 1993, 55). It is often suggested that large double-ring roundhouses are exclusive to EIA Wessex (cf. Cunliffe 1995). But this is due to the disproportionate amount of research undertaken in that area (Harding 1974, 45) as well as a concentration on Little Woodbury-style sites. In fact, around 200 structures with a diameter of 10 m or above are known from northern Britain and these range in date from the later Neolithic to the RIA. Table 4.1 reveals that double-ring structures in excess of 11 m diameter are a rarity. Where then does this leave our type-sites of Little Woodbury (13 m) and Longbridge Deverill Cow Down (15.5 m)?

It has already been suggested that the large EIA houses of Little Woodbury and Longbridge Deverill Cow Down might not be quite what they at first seem (see 4.2.3). If the outermost feature is actually non-structural and the inner post-ring represents the house wall – a situation supported by the distribution of ceramics and daub at Longbridge Deverill CS 3 (Chadwick Hawkes 1994) – then the internal diameter of each structure is reduced to c. 11 m. The structures remain double-rings however, as a reasonably plausible internal post-ring can be elucidated amongst the internal postholes at both sites (fig. 4.6). A similar argument may be used for the reinterpretation of LrIA West Plean where one post-ring, if contemporary, is remarkably off-centre. In this case the outer wall-slot can be seen as a strong fence, or palisade, encircling a 7.6 m diameter post-built simple-ring structure (fig. 4.19). Interestingly, in his work on the optimum positioning of internal post-rings, Hill (1984) pointed to West Plean as an anomalous structure. Little Woodbury CS 2 and Longbridge Deverill CS 2 might also be seen as anomalous on Hill's (1984) graph. At both structures, the outer post-ring is uncharacteristically close to the internal post-ring for a structure of this size.

Following Bersu (1940), Chadwick Hawkes (1994) continues to see the outer post-ring as structural. This hinges on the traditional interpretation of the 'porch' as a structural unit, an interpretation which this study challenges (see 5.3.4). The current author prefers to see the outer post-ring as a non-structural feature – perhaps with wattle panels – which works to enclose the space beyond the house wall. Is it perhaps utilising this space for the shelter of livestock or as storage space as suggested by Chadwick Hawkes? The outer post-ring postholes at Little Woodbury and Longbridge Deverill are however rather large. This might initially suggest that they were indeed structural. Did they function as eaves-posts: perhaps supporting the rafter ends during construction? The fact that they are not in line with the posts of the inner post-ring means that this is unlikely. Were large posts needed to counteract the live thrust of livestock? The elongated profile of the postholes might indicate the use of planks. Alternatively it may reveal the 'rocking motion' used in the extraction and replacement of smaller posts (Reynolds 1993).

A similar argument can be made for the EIA double-ring at Pimperne (fig. 4.21). In this instance the close-set nature of the internal post-ring again argues for its status as the house wall and the outer stake-ring is unlikely to be structural (see 4.2.3). The existence of what initially appear to be genuine eaves-posts (implying that the whole was roofed) are actually less consistently aligned on the inner post-ring than Harding *et al.*'s (1993) fig. 18 suggests. However – unlike Little Woodbury and Longbridge Deverill – a further internal post-ring is not forthcoming at Pimperne. The side doors to either side of the main doorway at Pimperne might be seen as providing access into the external peripheral space. Might this also be one reason why drainage-gullies tend to stop on average 2 m before the doorway to either side of the main entrance? Was access to external space often provided to one side of the entrance to a structure? At LrIA West Brandon (fig. 4.22), what again appear initially to be genuine eaves-posts are also not consistently aligned on the internal post-ring. The extreme width of CS B's periphery also argues against total roofing. However the wider spacing of the posts in the internal post-ring (c. 2.5 m) is less consistent with its interpretation as the outer wall. At West Plean, Steer's 11.6 m CS II can also be reinterpreted. Instead, a 6.9 m post-built simple-ring is rebuilt at 6.4 m with a slight shift to the north and is enclosed by a palisade.

So what was the relationship between the non-structural outer feature and the eaves? Fig. 4.23 illustrates the two most likely alternatives. Type 1 shows the non-structural feature as being built up beneath the eaves thus enclosing the external eaves-space, perhaps creating an area for livestock or storage, external to the living space. This is perhaps the preferred reconstruction for the Pimperne stake-ring. However in order for this to be the case at Little Woodbury and Longbridge Deverill, each would require a wall height in excess of 2 m. Such a high wall is not accepted (see 5.3.3) and so they may be more likely to be of Type 2. Type 2 provides a circular 'yard' area. Whilst practical if used for livestock – providing both shelter and ventilation – it

would also lead to the formation of mud in these circumstances and would require drainage. Might we see the *ring-ditch* houses of north-east Britain in this context? Such an arrangement might certainly be envisaged for West Pleen; and also at Llandegai CS 2. Alternatively, Type 2 might reveal the use of an encircling fence to prevent livestock external to the structure from grazing on the thatch. The lack of roof protection in Type 2 would lead to a faster rate of decay for the uprights and this might explain the elongated nature of the (?repaired) postholes at Little Woodbury and Longbridge Deverill. In light of the above, many of our accepted interpretations of large double-ring houses may need new thought.

If size was important to Bersu, it was also important to the LrIA-RIA inhabitants of Aldclune in Perthshire: the owners of the largest roundhouse on record. Two sites at Aldclune reveal at least four phases of construction and maintenance activity as the inhabitants struggled to prevent the collapse of their unfecisibly large, oval, timber structure (fig. 4.24). Their first structure – dated to the LrIA – had an average internal diameter of 19 m (21 x 17 m). At some point, a stone buttress had to be added to the exterior wall at the front of the structure. Additional walling was then placed either side of the entrance in the structure interior, thereby reducing the internal diameter to 17 m (17 x 16 m). This action also served to reduce the ovality of the structure. The RIA double-ring structure at Site 1 – which is taken to be the next residence of the Aldclune people – begins with an average diameter of 16 m (17 x 14 m). Unfortunately, the ovality of the structure was again increased – although not to the same degree as Site 2 Ph.1. At some point a pcnannular stone buttress wall was added to the exterior of the house. The house then appears to have been rebuilt on practically the same plan. At Site 1, Ph.2 the exterior buttress wall is replaced with an internal version, reducing the internal diameter of the double-ring to an average of 13 m (14 x 13 m) and reducing ovality to the same level as Site 2 Ph.2.

The people at Aldclune wanted a structure which was firstly, oval; and secondly, huge. They were testing architectural principles on both these counts: the two do not go together. There are three possible scenarios: 1) the Aldclune builders were amateurs to roundhouse construction; 2) they were persistent experimentalists and design innovators; or 3) they were so hell-bent on display through monumentality that they flew in the face of two millennia of architectural knowledge. Nevertheless, the two sites at Aldclune span a period of at least 50 years and potentially several centuries. Structurally, the three construction phases should have lasted for c. 180 years. So the Aldclune structures weren't a complete failure they simply needed substantially more maintenance and re-designing than the more common circular, smaller structures. Perhaps that wasn't too great an effort for the people of Aldclune for whom it seems to have been very important to stand out from the more common architecture. Elsewhere in Highland Scotland at this time the average structures were about half the size of those at Aldclune and were post-built or stone-walled. In Perthshire, however, this is the time of the

large circular homesteads and it is within this context and this tradition that the Aldclune structures must be viewed.

Triple-Ring Structures

Only 3% of structures have more than one internal post-ring (fig. 4.18). Triple-ring structures generally have a diameter of 10 m and above, most triple-rings lie between 11-16 m. This is at odds with traditional ideas regarding the typical upper limits of triple-ring structures particularly as manifested in Bersu's search for the 'big buildings of the aristocracy'. At Scotstarvit, he excavated what he saw as a 19 m diameter triple-ring structure. Reinterpretation of the site suggests a 13m diameter, re-built, double-ring structure with an enclosing, concentric fence or palisade (fig. 4.25). This becomes clear when we consider the position of the door-post and also the nature of Bersu's inner-ring: a wall-slot implies load-bearing continuous walling, a feature only rarely found in the interior of a structure. At Milton Loch, Piggott's outer wall might instead be seen as either the limit of the crannog-platform or as a fence encircling a 9 m diameter structure (fig. 1.16, 4.26). Again the position of the doorposts is the clearest indication for the location of the house wall. In addition, the high degree of repair to the front of Piggott's outer wall suggests that it was unprotected and hence non-structural. Both Bersu and Piggott were under the misapprehension that all features that were concentric were also structural. This does not mean that large triple-rings did not exist in prehistory, just that some might benefit from reinterpretation. Similar conclusions have been reached independently in the recent interpretation of the larger triple-ring structures at Dryburn Bridge (Dunwell & Triscott forthcoming) and may serve to inform the forthcoming publication of the structures at Broxmouth.

Massive Structures

In 1941-43 Bersu excavated three sites on the Isle of Man. These structures were interpreted as having diameters of between 20-25 m. Bersu claimed that: "wooden round houses with two aisles and a diameter of up to 20 m are known" and that the Manx structures were a further architectural development of the same type (Bersu 1977, 88). For Bersu, the outermost ring of uprights at Ballacagen Lough A is the outer wall of the structure (figs 4.27-4.28). The result is a sextuple-ring structure. Just three structures might be interpreted as quad-ring structures: Broxmouth CS B (Hill 1982b); Candle Stane (Cameron 1997); and Dryburn Bridge CS 2 (Triscott 1982). All three of these structures were published only in interim form with limited illustration at the time of this study. The publication draft of Dryburn Bridge leaves open the possibility of the quad-ring interpretation; however a rebuilt triple-ring structure is perhaps more likely (Dunwell & Triscott forthcoming). Bersu's sextuple-ring structure is without parallel.

Nevertheless, few have analysed Bersu's total-roofing of the Manx structures and his interpretation has, on the whole, been accepted (cf. Harding 1974).

Massive roundhouses did certainly exist. Around twenty structures in northern Britain have a diameter of 15 m or above. These are not known before the LBA but do continue into the RIA. Nevertheless, structures in excess of 15 m are very rare - 99% of circular structures in northern Britain have a diameter of less than 15 m – and no published structures are known with a diameter in excess of 19 m (contra Bersu 1977, 88). The height of a structure's apex can be gained by adding together the radius of the structure and the wall height (Strang 1991). So Bersu's 25 m diameter structure would have a 13.5 m high apex. Its inner-ring posts would need to be 5.6 m long and its main rafters an incredible 18.5 m long. Such a structure is simply not feasible⁹. Bersu suggested that the roof was instead a low, turf-covered dome, but subsequent experiments with even small turf roofs have rapidly failed (Reynolds 1979; Waddington & Davics 2002). It is suggested that Bersu's clay layer – which he saw as the turf from a huge dome roof – *might* be decayed turf from the (much smaller) structures' roofs along with clay from their walls which was homogenised by water action following collapse.

Looking at the general plans of the Manx sites, with their mass of internal posts, it is easy to see why Bersu focused on the most obvious, outer feature. The Manx report was unfinished at the time of his death and had his interpretation been constructed – as he himself advocated – his interpretation may well have changed. Bersu is reluctant to identify what are quite clearly three separate structures at Ballacagen A, Phase III (fig. 4.28). Instead, to reconcile Phase III with the massive-layout already argued for in the earlier two phases, his fixed reading of the plan shoehorns them into one massive structure: "detail seems to have been too easily overlooked and complication sacrificed to the establishment of 'type'" (Evans 1998, 185). The same interpretation is found at Ballacagen Lough B and again at Ballanorris. Bersu argues that because a layer of brown organic material - a thin plank floor – and an occupation soil covers the whole area, the whole area must then be roofed. If occupation soil covers the whole area this may be as a result of post-collapse processes especially when we remember that the structures are in a wetland location.

The alternative interpretation of Ballacagen Lough A Phase I is that Bersu's 'Ring 4' is the outer wall of a structure c. 12 m in diameter (fig. 4.28). Whilst this reinterpretation refers specifically to Ballacagen A Ph. I the principles can also be applied to the other phases in Ballacagen A as well as Site B and also Ballanorris. Bersu does refer to the area inside Ring 4 as the 'living area' but does not see Ring 4 as the outer wall of the structure. This is the only area to have a clay

⁹ The same conclusions were reached by Strang (1991) regarding the supposed total-roofing of the c 35 m diameter Navan Fort in Co. Armagh (Harbison 1988).

floor. The position of the doorposts at Ballacagen A and Ballanorris – placed in the centre of the entrance gap and concentric with the outer wall – also help to expose the real outer wall (figs 4.29-4.30). The structures are also seen to have porch arrangements. The Ring 3 posts in Ballacagen A Ph.I can now be interpreted as eaves posts considering both their concentricity to the outer wall (Ring 4) and the radial association they have with the internal post-rings (fig. 4.29).

The argument is further supported if we consider that the Manx sites are, in fact, of crannog type (Ó Riordáin 1979; Hogg 1980). The sites were situated on marshland and Bersu's description of 'criss-crossed planking' seems to find parallel in the crannog material of Milton Loch (Piggott 1952-53). There is even the same use of planks with holes for vertical timbers. The space outside Ring 4/Ring 3, which Bersu sees as roofed can, instead, be seen as a raised platform onto which the successive structures were built; the concentric posts are seen as the supports or sunken 'stilts' for such a platform. One of Bersu's main arguments for the total roofing of the Manx structures is the absence of drainage- or drip-gullies. If we accept, however, that Ballacagen-Ballanorris are crannóg-type structures then we find that a drainage-gully would not be needed and a drip-gully would not form. His other main argument for total roofing - that the posts had all collapsed in the same direction - is again defunct if one envisages a conjoined platform: the various elements of which would almost certainly collapse in the same direction on decay.

Many excavators have misinterpreted structural evidence in the light of Bersu's massive-roundhouse model. The idea that structure size is an indicator of status underlies much interpretation in roundhouse studies (e.g. Phillips 1934, 6; Rahtz & ApSimon 1962, 305; Manby 1980, 323; Coggins & Fairless 1984, 14). The largest structure in a settlement is still often described as the residence of the head of the settlement (e.g. Drewett 1979, 4; Reid 1993, 35) with settlements containing large houses described as 'elite homesteads' (Cunliffe 1995, 37). Such a position has long been criticised (e.g. Alcock 1962; 1965) but has continued to prevail as lingering preconceptions regarding progressive development have tended to persist. The size = status principle also underlies the interpretation of settlement types (e.g. Mytum 1999). Whilst perhaps more justified at this level, it remains problematical. Structure size might instead be seen as an indicator of household demography and/or economy.

4.2.5 Shape

The term *circular structure* is used in its broadest sense and refers to sub-circular, sub-oval and oval forms, as well as structures based on a true circle. The majority (68%) of prehistoric structures are of circular or sub-circular shape. Only one third are close to the shape of a true

circle, the same proportion as those which can be described as oval or sub-oval (fig. 4.31). Oval structures have two sub-types: the basic oval - Walton's (1952) *elongated circle* type - to which the basic principles of circular architecture apply; and what can be called the *long-oval* type where length is more than 25% greater than width i.e. when the length:width ratio is greater than 1:0.75. The latter account for one in two oval structures. There is no real regional or chronological bias but they are represented at an above average level in the earlier prehistoric period and are also more common in upland landscapes. It has been suggested that an elliptical shape might come about due to the problems of posthole sinking in harder geologies (Strachan *et al.* 1998, 63).

Fig. 4.32 reveals that as structure size increases there is a slight decline in the numbers of oval and sub-oval shapes with a corresponding trend towards greater circularity. Using an oval form works to increase the size of a circular structure without changing the house type (Walton 1952, 139). The only main difference in long-oval architecture is that a ridge pole may be utilised in roof construction (see 5.3.2). However in oval buildings, longitudinal as well as circular forces have to be countered (Reid 1993, 14) meaning that they see a decline in popularity throughout prehistory. House shape has a strong correlation with post-ring symmetry in double-ring structures (fig. 4.33). Symmetry is least represented in the long oval form and most in the true circle. This highlights the key relationship between circularity and structural stability. A polygonal shape is rare (thirteen examples exist, of varying date) and whilst it has been argued as evidence for sill beams (Monaghan 1994, 38) it is equally likely to reveal the use of pre-fabricated wall panels. At Wanlip, Beamish (1998) argued that the latter was not the case and the polygonal shape revealed that the wall had been constructed to meet the wall-plate, thus revealing the non-structural nature of the wall during construction.

4.3 Design Principles

4.3.1 Structural Systems

Two in three structures are of simple-ring type where the load of the roof is taken on the outer wall. One in three provide extra support in the form of an internal post-ring. There is a clear correlation between structural type and the size of the structure (fig. 4.34). The outer wall type also had an effect on the load put upon the structure. The most trusted outer wall was that provided by the wall-slot; followed by the post wall and the ring-bank. Least trusted was the stone wall. The depth of central-ring postholes was found to be proportionate to increase in structure size (fig. 4.35). It is commonly understood that the central-ring takes more of the weight than the outer wall: dimensions of internal posts are generally expected to be greater than those of the outer wall. In double-ring structures, the average outer wall feature depth is

0.28 m and is 0.30 m for internal posts. Width is 0.30 m for the outer wall and 0.32 m for the central-ring. Only a 2 cm difference in both cases. Where central-ring postholes are deeper, as at Lairg CS 2, this may simply reflect the greater height of these posts and their need for slightly deeper foundations. It may not in fact be an indicator of a greater structural role for the central-ring. The average dimensions of outer wall wall-slots and postholes were plotted against structural type (fig. 4.36) and were found, on the whole, to increase with structure size. This might suggest that the outer wall does tend to remain structurally important despite the addition of inner post-rings, particularly in mass wall structures. Where dimensions of features in both inner and outer rings could be established on the *same* site: it was revealed that whilst width was reasonably consistent between outer and central features, depth was clearly a more variable factor (figs 4.37-4.38).

Traditionally¹⁰, the structural role of internal supports has been over-played in roundhouse interpretation to the extent that many early excavators had little confidence in the structural role of the outer wall. Some even resorted to ideas of 'invisible' central-ring posts standing on lost post-slabs or on the ground (Lowndes 1964; Close 1972). Even structural partitions were argued for (Jobey 1959). See also Alcock's (1960) discussion. As a result, the idea that the outer wall is less structurally important than the post-ring has gained ground (cf. Stevenson 1984). The implication is again that the outer wall is not structurally important. This, however, is simply not the case in *most* circular architecture. The work of Peter Reynolds has shown that, in fact, the structural role of the outer wall is crucial during construction and at Castell Henllys it was found that the central-ring actually has no structural value following construction (Bennett 2001). The suggestion that the outer wall is not structurally important can only be supported in what would effectively be simple-ring structures (in structural terms) where the outer wall was secondary to the rest of the framework and was built up under the eaves to enclose the eaves-space (see fig 4.23, Type 1). This would, however, lead to structures in the record with very narrow peripheries. Such structures are rare but have been argued for at Moel y Gaer (Guilbert 1981) and Green Knowe (Hill 1984). However the current author believes that these supposedly timber-built double-rings with their weak outer walls have been misinterpreted and are in fact the remains of wattle-lined turf-walled structures (see 4.2.3).

There are three main stresses inherent in circular architecture: 'tension' (pull), 'compression' (pushing), and shear (slippage) (Oliver 1987, 58). Fig. 4.39 reveals which stresses are at work in the various circular house-types. These stresses are at their worst during and directly after construction as, over time, many of the lateral stresses decrease due to plastic deformation of the wooden elements. The main architectural problem posed by a circular structure is how to carry

¹⁰ Perhaps following the misunderstanding of comments made by Bersu at Llwyn-du Bach (1948-49, 185).

the 'dead load' of the roof and counteract shear under the force of gravity prior to the structure becoming a stable, self-supporting unit. The total weight of the completed *Longbridge Deverill Cow Down House* roof was *c.* 40 tonnes (Roger Hedge pers. comm.). A successful design must neutralise the lateral thrust of the roof by transferring as much of it as possible into horizontal form (Hill 1984, 80). Fig. 4.40 shows how the dead load is successfully distributed in a cone-and-cylinder type house. When constructed on a slope it is common for the downhill features to be of greater dimension to provide a counterthrust against gravity (cf. Piggott 1948-49, 59; Strachan *et al.* 1988, 63).

Gravity requires that the load of the roof must be carried to the ground where it can be absorbed. As the load is carried down the rafters in radial form it creates the potential for shear (slippage) at the wall-head. Studies of African traditional architecture reveal the importance of strong tying materials at the point where the rafters and wall posts meet. Strong joints prevent slippage at the wall-head and instead the load transfers into vertical form down the house wall. Again slippage can occur at the wall base. If the load remains unaltered in radial and vertical form the force at the points of transfer – roof to wall and wall to ground – is too great and collapse is likely. There are a number of ways of combating the problems outlined above through architectural design. Musson (1970a) – a trained architect turned archaeologist – identified five of the six basic *structural systems* which are able to cope with the various lateral and radial stresses of the cone-and-cylinder structure (fig. 4.41).

Outer Wall

Timber Sinking

Commonly used in prehistory, this system works against shear at the wall base. By sinking the area of final load transfer into the ground – digging a post-hole or wall-slot for wall uprights, or driving a stake in – the stress is absorbed by the greater mass of the ground. The most successful load transfer is achieved in a stable wall of contiguous uprights where the load is distributed evenly around the full circumference of the wall. For only 52% of prehistoric timber circular structures the load-bearing element is the house wall alone, however this is linked to the fact that 33% of timber structures have a diameter in excess of 9 m and thus require further support in the form of an internal ring of posts. According to table 4.1, wall-slot structures of up to *c.* 7 m and post-wall structures of up to *c.* 6 m diameter are most likely to rely on the timber-sinking system alone; whilst those of >9 m must employ an internal post-ring during construction.

Mass Walls

Again this system helps to reduce shear at both points of transfer and is common in prehistoric architecture. The sheer bulk of a stone wall or ring-bank absorbs and resists the outward

pressure of the rafter ends transferring the load successfully to the ground again via its mass. The nature of the mass wall means that the vertical load is redistributed equally throughout the wall circumference thereby substantially decreasing the risk of shear. For 81% of stone or ring-bank structures the load-bearing element is the wall itself. Perhaps unsurprisingly the vast majority of mass-walled simple-ring structures rely upon the mass wall system for structural support. This is linked to the fact that 94% of these structures have a diameter of less than 10 m and do not need further support in the form of an internal ring of posts. According to table 4.1, stone-walled structures of up to c. 7 m diameter and mass-walled structures of up to c. 6 m diameter are most likely to rely on the bulk wall system; whilst those of >9 m must employ an internal post-ring. This is not too different from the 9 m figure given by Bersu at Llwyn-du Bach (1948-49, 185).

Buttresses

An additional method used to reduce shear at the wall base is the provision of a buttress (Oliver 1987, 59). This has the effect of creating a 'counter thrust' at the final point of load transfer. Thick mass walls work to incorporate this buttress effect. Reynolds found that a wall-plate was best positioned at 0.30 m from the inner face of a 0.91 m thick wall. The thrust of the roof is exerted diagonally through the wall leaving the upper, outer corner apparently redundant. In fact this part works as a buttress by exerting a downward pressure and thus combating the lateral thrust of the roof through the wall (Reynolds forthcoming, 222). Separate buttresses are most commonly found against stone walls which have become unstable. These follow the first signs of structural failure and are a maintenance practice as much as a structural system. Buttresses can also be used at the base of timber walls and whilst quite rare can be seen at Aldclune 2 (Hingley *et al.* 1997) and at Rispain Camp (Haggarty & Haggarty 1983). In a modern shepherds' hut the upcast of a drainage-gully was banked against the structure wall taking on the role of a buttress on the uphill side, whilst on the downhill side a main rafter takes on this role (fig. 4.42). The recent failure at Reynolds' *Moel y Gaer 3 House* has led to talk of sinking buttress posts on the outside of the timber wall (Dai Price pers. comm.). The fact that buttresses are so rare in prehistory is testimony both to the wealth of knowledge of the prehistoric architects and of the well-informed systems which they employed.

Supports

Post-Rings

When the diameter of a structure increases beyond a certain point the wall alone is no longer able to take the load of the roof during construction. In these cases an internal post-ring and ring-beam is provided. The ring of posts and the ring-beam share the load of the roof with the wall. Table 4.1 reveals the general distribution of structure diameters according to the structural

systems in use. Post-wall and mass-wall structures of up to c. 6 m diameter are most likely to be of simple-ring construction. Wall-slot and stone wall structures of up to c. 7 m diameter are most likely to be of simple-ring construction. Table 4.1 suggests that in prehistory, it was generally understood that a simple-ring structure could easily take the load of a roof up to 9 m in diameter. The addition of an internal post-ring provided the opportunity for a diameter of 10 m or above. Table 4.1 also suggests that, after the addition of a post-ring, timber-walled structures have – or were perceived to have – slightly more load-bearing capacity than stone- and mass-walls.

Whilst as many as fifteen internal post-ring posts are known, the average number is seven. Four internal posts has been seen as controversial since Musson's (1970a) critique of Bersu's Little Woodbury quartet but at least six structures do seem to have a genuine square of supports. A four-poster was reconstructed as a circular structure at Castell Henllys (Mytum 1999) and Murray reconstructed the *Greenbogs House* at Archaeolink with four internal posts. Ethnographically, the roofs of the Kikuyu house are recorded as being supported on four posts (Denyer 1978, 156). Central-ring features are on average 0.33 m deep and 0.31 m wide. 94% of central-ring features are posts; however twenty-five structures revealed what was interpreted as an internal supporting wall-slot. Only 3% of structures have a second internal post-ring (fig. 4.18). The majority (83%) of triple-ring structures have between nine and fourteen posts in their inner-ring. The average is eleven. Inner-ring features have the same average depth as central-ring features (0.33 m) and a slightly greater width of 0.35 m. They are more widely spaced than their central-ring counterparts.

A word of caution regarding the interpretation of concentric, internal posts as structural is provided by Close-Brooks' shepherds' hut where the 'half' post-ring is non-structural (fig. 4.42; see also Erixon 2001). Post-end decay in the central-ring of the 1982 Castell Henllys house revealed that the post-ring was not structurally necessary in the post-construction phase (Bennett 2001). Testing this idea, Bennett constructed the 1998 *Castell Henllys House* – a 13 m simple-ring with post-and-wattle walls set in a wall-slot – using only a central post, temporary scaffolding, and three ring-beams: a wall-plate; a cross-braced ring-beam, and an upper ring-beam (*ibid*; forthcoming). A post-ring then, is only *needed* during construction where ring-beam technology is employed. The post-ring acts as scaffolding and could, if desired, be removed following the completion of the structure. Its subsequent decay is therefore of little consequence (cf. Reynolds 1993). Only time will tell if the 1998 Castell Henllys structure is a success but it currently remains sound after almost five years (Phil Bennett pers. comm.).

Central Posts

The central post is not load-bearing. (Musson 1970a, 274). Reynolds believed that the central post in the *Maiden Castle House* actually accelerated collapse after introducing further stresses (Reynolds 1993, 105; 1979, 35). The provision of a central post simply acts to stabilise the apex, in this way the rafter ends are drawn inwards rather than outwards. A central post was used in this way during the construction of the *1998 Castell Henllys House* and was cut off to below the ring-beam immediately after completion (Bennett 2001). In the mid 1960s the central post was included in a number of typologies as apparently a Bronze Age or EIA form (see 1.2.3). So in vogue was the central post that even the smallest, most off-centre feature was interpreted as a structural support to fit the model. Only 37 structures (3%) have a genuine central post in northern Britain and of these only seven are of secure BA/EIA date. The central post whilst rare in prehistoric Britain is more common in the ethnographic literature particularly in 'tent' structures. *Long-oval* structures (see 4.2.5) are most likely to be roofed differently to *circular* structures. In smaller examples, the provision of a ridge pole might remain archaeologically invisible. However where maximum diameter exceeds *c.* 8 m they may employ further support. Two internal posts may be used to support the ends of the pole as at Greenbogs (Greig 1996); Staple Howe (Brewster 1963), and Carronbridge (Johnston 1994).

Eaves Posts

By allowing the rafter butts to project beyond the wall an inward counter-thrust is created at the top of the wall (Avery & Close-Brooks 1969, 348). If the rafters are carried to the ground this provides maximum support but leads to accelerated decay (Reynolds 1993). In projecting eaves, 'caves posts' may be used to support the rafter butt and redistribute the load of the roof beyond the point of transfer at the wall-head. The provision of eaves posts is rare and is definitely present in only 19 structures (< 2%). All are timber-built and four out of five of them have a diameter in excess of 8 m. They are often radially associated with post-ring features suggesting that they are structural but do not employ a ring-beam. They are on average 0.19 m deep, 0.26 m wide and are spaced more widely than other features at an average of 2.6 m. In the ethnographic literature eaves posts are often not structural, but are employed more to enclose the external eaves space. They are positioned at an average of 0.92 m from the outer wall. Five of the rafters in Close-Brooks' shepherds' hut are carried to the ground but are naturally crooked so that they are planted near-vertically, close to the wall (fig. 4.42). Eaves posts are not produced by the movement of the rafter butts on the ground during construction (contra Reynolds 1993) - they are *vertical postholes* (cf. Beamish 1998, 32). Are they perhaps employed to decrease the pitch of the roof by propping up the rafter butt; or to raise the height of the wall (*ibid*)? At Castell Henllys a structure constructed without a ring-beam began to fail after just three years and the rafters ends were propped with stub verticals (Bennett 2001).

Beams and Braces

Ring-Beams

Ring-beams significantly reduce stress at both points of transfer, especially during construction. A ring - made of woven withes or jointed timbers - is attached to the main rafters thus creating a robust, stiff framework and helping to redistribute radial stress by transferring it into horizontal form and spreading it around its circumference. There are three main types of ring-beam: a *wall-plate* which is positioned at the wall-top; the *main ring-beam* which is positioned at the top of the post-ring; and the *upper ring-beam* which is positioned one-third of the way down the slant height of the roof from apex to rafter end. At this point it works to hold the rafters apart and to counteract natural sag as well as providing anchorage for the subsidiary rafters (Reynolds 1979, 37; 1988, 13; forthcoming, 216). In construction, a ring-beam acts to stop the main rafters from splaying, thereby providing stability to the cone. When used at the top of the wall, or at the top of the post-ring, it works to stabilise the uprights, firming up the shape of the cylinder and creating a stable unit on which the weight of the roof will finally rest. In addition, purlins (horizontal rings) in the roof act as miniature ring-beams (Reynolds 1979, 39). The same is true of the horizontal wattles of a wattle-and-daub wall.

The position of the C-R is determined by the position of the main ring-beam in the roof. Hill (1984) calculated that a post-ring and its ring-beam would be positioned so as to distribute weight evenly between the outer wall and the post-ring (during construction). Reynolds (forthcoming, 216) states that rafter sag is not a significant problem in a 6 m diameter structure but must be addressed in larger structures with the provision of ring-beams. This can now be supported by the archaeological data which reveals that structures of 6 m can be supported without an internal post-ring, whereas structures of 10 m and above do require a *main ring-beam*, as apparently revealed by the provision of an internal post-ring. Structures of between 7-9 m diameter are less straight forward and reveal that whilst some are provided with a post-ring and presumably therefore with a *main ring-beam*, others are not (table 4.2). This might reveal trial-and-error construction. It could also reveal the practice of 'building big' in these 'borderline' structures. Either ring-beam technology was not 'trusted' without its post-ring in these structures or the post-ring was simply regarded as 'permanent scaffolding'. Alternatively, providing a post-ring in a 7-9 m diameter structure may be involved with the provision of an upper floor in structures that do not necessarily need a post-ring for structural reasons. A Castell Henllys reconstruction built in 1989 was constructed *without* a ring-beam and was already failing after just three years (Bennett 2001).

	Simple-Ring	Double-Ring
Bulk-Walls	3-9 m	7-10 m
Timber-Built	4-9 m	7-11 m

Table 4.2 The provision of a main ring-beam in circular structures

Cross-Beams

Also known as a tie-beam, this method works to hold the rafters in place so that they cannot move outwards, as a result shear is reduced at the wall-top. The cross-beam counteracts stress using a technique called 'triangulation' which diverts some of the load horizontally. A cross-beam is a transverse beam. It is tied either between two rafters or two internal posts and stretches across the diameter of the structure (cf. fig. 4.42). In this way it physically prevents the outward movement of rafters. Use of the cross-beam is relatively common in African traditional architecture (e.g. Denyer 1978, 102; Gebremedhin 1971, 114; 116; Levin 1971, 148). In all cases it is positioned in the top third of the structure; presumably to ensure that the amount of headroom remains uncompromised (contra Musson 1970a). Although not visible archaeologically, it has been argued that the technique may have had an added benefit in providing the basis for a second floor (Chadwick Hawkes 1994, 66; Reynolds 1982) as at the *Greenbogs House*. The main ring-beam of the 1998 *Castell Henllys House* was cross-braced (Bennett forthcoming). It has been suggested however that circular architecture rarely employs cross-beams and bracing (Avery & Close-Brooks 1969). Its reliance on accurate jointing means that it may have developed during the Iron Age with the introduction of the saw (Reid 1993, 20).

Braces

This is another method that is used relatively high up in the frame to reduce shear at the wall-head. A brace is a strengthening beam which is positioned radially between rafters and internal supports. A brace is used to stabilise the wall-head/rafter-end joint and redistribute some of the stress horizontally but is rather ineffective compared to the cross-beam. As a result, use of the system is rare in African traditional architecture. The system was used in the *Greenbogs House* where their role was less structural and more concerned with supporting the attic/loft floor. In the Gurage structure, radial struts are employed to tie the ring-beam to the central post. These diagonal braces fix the roof – the construction of which begins on the ground – to the frame but also serves to redistribute stress (Gebremedhin 1971, 116). It is impossible to know whether this method was used in prehistory. Whilst the degree of 'overbuilding' in the record might imply that it was not necessary; the trend *for* overbuilding may mean that it was nonetheless employed in some structures.

4.3.2 The Optimum Ratio

Hill (1984) suggested that the post-ring/main ring-beam of a double-ring structure would be positioned so as to distribute the weight of the roof evenly between itself and the outer wall/wall-plate. The post-ring is thus positioned at the point where the roof area is halved. The resulting ratio for optimum placement – in structural terms - of the post-ring is 1:0.707. So, in a 10 m diameter structure the diameter of the post-ring is c 7 m. Hill's ratio was tested against a dataset of 270 double-ring structures (figs 4.43–4.45). Using a line of best fit we find that the ratio is actually 1: 0.615 (1:0.62 for timber-built structures and 1:0.61 for mass wall structures). The trend is for the post-ring to be positioned further away from the wall - the ring-beam slightly higher - than the optimum ratio suggests (fig. 4.46). This may reveal that the weight of the roof was greater towards the apex perhaps this area was more heavily thatched perhaps with an elaborate finial. Alternatively, it might imply that the provision of peripheral space was given priority over structural norms (Reid 1989; see 6.3.1). There is also a further possibility. By increasing the average pitch of 45° we provide more weight at the top of the structure. This naturally affects the ideal position of the ring-beam (contra Hill 1984, 81). So if the average prehistoric ring-beam is positioned higher up than Hill's ratio suggests this might indicate that the pitch of the average prehistoric roof was slightly greater than 45°. This may be confirmed by the recent work of Beamish (1998) at Wanlip (see 5.3.1).

The uncommonly narrow peripheries of structures at Moel y Gaer and Green Knowe do not fit with the optimum ratio, leading Hill (1984) to suggest that in some double-ring structures the outer wall was less structurally important. Structures from both sites might however have been misinterpreted (see 4.2.3) and it may, in fact, be rare for an outer wall not to have a structural role. Hill's (1984, 82) attempt to dismiss the optimum ratio as potentially naïve is misguided. The provision of equal weight distribution is crucial, particularly during the construction of larger structures. That temporary scaffolding could produce the same effect did not mean that this technique *was* employed. In structural terms we can think of a post-ring *as* scaffolding but - at a time when overbuilding was rife (see below) - it was presumably not considered 'temporary' by the prehistoric builders. The optimum ratio is considered to be a technique necessary for the successful construction of large circular structures, which is presumably why post-rings do tend to cluster around it. The spread around the optimum is not surprising particularly when we consider the various factors which can alter the desired position: non-constant thatch weight, spatial design, roof pitch, and eaves width. We must also consider that there must have been some degree of trial-and-error construction and of experimentation outside the accepted techniques.

An attempt was made to determine to what extent Hill's ratio was applied to the position of the central post-ring in triple-ring roundhouses. Fig. 4.47 reveals that the outer wall and inner-ring are generally well spaced across the optimum ratio, revealing a basic adherence to engineering principles. They are however more likely to be positioned wider apart in smaller structures, and closer together in larger structures. There appears to be a trend towards the 'standardisation' of peripheral space. This is in parallel with the findings from larger double-ring roundhouses. Fig. 4.48 reveals that the inner-ring and central-ring are generally positioned further apart than the optimum ratio suggests. The results from these larger triple-ring structures seem to indicate a desire to control the size of both the periphery and the central area. Is this structural or to do with the use of space? We could argue that the desire to decrease the central area is actually a *structural* choice. Optimum placement in terms of equal weight distribution is actually too low down the slant height of the roof to counteract rafter sag which occurs one third of the way down from the apex (Reynolds 1979). As such, the placement of the central post-ring in triple-ring structures may choose to combat rafter sag instead of opting for optimum weight distribution (fig. 4.46). The positioning of the inner post-ring however might have more to do with the standardisation of peripheral space (see 6.3.1).

4.3.3 Post-Ring Symmetry

Post-ring symmetry was first identified by Bersu (1948-49) at Llwyn-du Bach (fig. 4.49a). Guilbert (1983) built on this work following his excavations at Moel y Gaer. These structures revealed a design principle in the detail of their ground-plan. It was found that a rough 'laying-out' process determined the positioning of internal posts. Such a technique helps to ensure the production of a near-perfect geometrical cone during construction. When a cone is imperfect, hoop stresses may occur which ultimately threaten the stability and hence the durability of the structure (R. Hedge pers. comm.). Post-ring symmetry is simply a laying-out technique which ensures greater structural stability. Of 201 structures where the degree of post-ring symmetry could be established – having removed the data from Moel y Gaer to avoid distortion – it was found that three in five post-rings (61%) employed symmetry in their layout.

Axial symmetry – the type first identified by Guilbert (1983) – was seen to involve an odd number of posts and can be referred to as *odd-post axial symmetry*. The odd post is positioned diametrically opposite the centre of the entrance gap. The other posts are arranged in pairs at right angles to the baseline thus providing a mirror-image across the line: axial-line symmetry (fig. 4.49a-b). The ground plan was presumably set out from a baseline, or axial-line running from the odd post out through the entrance. If the structure has a degree of ovality then it is always the long axis which provides the baseline (Guilbert 1983, 71). Moel y Gaer provides some very precise examples of odd-post axial symmetry but Guilbert (1983) points to other

examples which are more imprecise e.g. Llwyn-du Bach. It can be argued that the reinterpretation of the Moel y Gaer structures as turf-walled double-rings might explain the concern with providing stability in the post-ring. The acceptance of axial symmetry has led to excavators identifying 'missing postholes' at sites which lack the odd post at the rear (e.g. Rideout 1996; Britnell *et al.* 1997). In fact, these sites reveal a different *type* of axial symmetry: *even post axial symmetry*.

In cases of *even-post axial symmetry*, post pairs are again positioned about an axial line but the line itself is not based on an odd post at the rear of the structure, for example at Harehope CS 3 (fig. 4.49c). Instead there are an even number of posts. The axial line was presumably only for guidance during the laying out process and did not become 'part' of the structure as was the case in odd-post examples. Even-post axial symmetry was identified by Guilbert at Catholme (Guilbert & Eliot 1999, 163). However this site may, in fact, provide a better example of *radial symmetry*. Radial symmetry reveals the equal spacing of posts around the circumference of the post-ring. The posts are not paired across the axis and instead the position of each post was obtained by measuring radially from a central point. Axial symmetry often appears to employ a degree of radial symmetry in the layout of posts, for example at Llandegai CS 2 (fig. 4.49d). One way of confirming this would be to measure the spacing of central-ring posts in degrees as Rideout (1996) does at Bannockburn.

The symmetry displayed in the post-ring often does not extend to the outer wall (Guilbert 1983, 80-81). However in those structures where the outer wall is not contiguous and the position of the outer- and post-ring posts can be established the two do seem to correspond, at least to some degree. It is suggested that whilst the symmetry of the post-ring - one of the first construction tasks - is generally preserved for archaeology; the outer wall - as one of the later tasks - only ever *responds* to the symmetry of the post-ring. The addition of further wall posts and later repairs rapidly mask any 'second-hand' symmetry in the outer wall. The use of a wall-plate also means that the outer wall posts do not carry the weight *directly* and thus symmetry between the outer wall and central-ring posts (radial alignment) is not necessary in structural terms. Where symmetry exists in both central-ring and outer wall it may indicate that a ring-beam was not in use. Guilbert suggests that *axial line* symmetry might reflect some structural device (Guilbert 1983, 77). Is it perhaps evidence for the use of cross beams in the roof? As such, might the use of axial line symmetry reveal the existence of an upper level - the provision of an attic/loft?

Two in five structures, however, have no evidence for post-ring symmetry. This implies that whilst symmetry does ensure greater stability it is not *essential* in structure design. In the Luyia house, for example, posts are positioned 'freely' inside the house to support the roof (Andersen 1978, 155). The houses at Dalladies are described by the excavator as having: "no great regard

for rigid geometry or regular spacing of the main timbers" (Watkins 1978-80a, 161). Guilbert (1983) identifies Scotstarvit Covert and High Knowes A CS1 as being of this type. Whilst we cannot suggest that a lack of post-ring symmetry implies that the post-ring is not structurally important during construction, it might be possible that at some of these structures we may have evidence for the use of scaffolding during construction; or of internal, concentric partition posts. An example to bear in mind is that provided by Close-Brooks' modern shepherds' hut where substantial, concentric posts were non-structural; instead supporting raised bunks in the periphery and also acting as the posts for annular partitions (fig. 4.42).

4.3.4 Over-Building

We know from the archaeological data that the timber-sinking system is capable of supporting a structure of 9 m diameter. Just over one in two timber-built structures (52%) rely on this system alone for structural support, yet two-thirds of these (67%) have a diameter of less than 10 m. One in seven timber-built structures use a post-ring/ring-beam when they do not technically need additional support. Similarly, one in eight stone- or mass-walled structures employ a post-ring/ring-beam when, structurally, it is not needed. There is slightly less confidence in simple-ring timber structures than in mass walls. Whilst the data suggests that a simple-ring roundhouse can take the load of a 9 m diameter, a degree of overlap exists (table 4.1). Post-wall and ring-bank structures of c. 7-9 m can be of either simple-ring or double-ring construction; as can wall-slot and stone-walled structures of c. 8-9 m. This might be interpreted as an attempt to make up for structural weaknesses elsewhere in the design, but no correlation exists between the provision of a post-ring in structures under 9 m and the provision of stake walls, nor regarding ovality. Furthermore no pattern existed according to period or region. This must be seen as the process of *over-building* at work.

In the ethnographic record walls and supports are often of a greater dimension than needed to deal with the force of the roof alone. The existence of random, 'live stresses', for example the effects of the wind, people, animals, door mechanisms etc. leads to the process of 'overbuilding' (Oliver 1987, 58). By 'building big' the architect is aiming to pre-empt these live stresses and produces what appears to be an overly stable structure. This process can also be seen in Peter Reynolds' first structure. The 4.3 m diameter structure was provided with three internal supports which were structurally unnecessary. In addition, the original plan had been to provide the structure with additional support in the form of cross-beams. This plan was abandoned after the full strength of the wattle walls was appreciated (Reynolds 1967, 6). It has been suggested – in reaction to Hill's (1984) emphasis on the structural optimum – that late prehistoric architects may have traditionally over-constructed for strength purposes (Strang 1991, 160); thus allowing spatial considerations greater freedom in house design (Reid 1989; Strang 1991). It is further

suggested that a post-ring was often provided in structures to supply the framework for an upper floor; whether or not a ring-beam was strictly necessary in a structural capacity.

4.4 Discussion

In prehistory, as in ethnography, there are marked similarities between the architectural forms of widely separated cultures. Oliver (1987) suggests, for the ethnographic record, that this *may* be attributable to the movement of people but also that it occurs because the same architectural solutions come about when people use the same tools, and have the same materials (*ibid*, 88). The *transfer of ideas* model may now explain similarities across space without invoking ideas of population movement. Alongside this is a high degree of local variation and we can also employ the *transfer of ideas* model regarding variability and change in house design. We can now envisage the interplay between what Rapoport (1969) sees as the 'stable equilibrium' of traditional architecture and the 'unstable equilibrium' of high-style, the latter causing changes *to* the model but not *of* the model (*ibid*, 87).

Tent structures are easy to construct and can achieve reasonable diameters, but the limited headroom next to the wall lowers the volume potential. Often such structures are utilised by nomadic peoples. It has been suggested in ethnography that the differentiation between wall and roof marks the transition towards greater sedentism (Cipriani 1938; Gebremedhin 1971, 110; Andersén 1978, 38). The substantial nature of the majority of prehistoric outer wall features count against the flexibility needed for the dome and the beehive. Postholes are vertical which counts against the wigwam. Tent structures are most likely to be found where there is an abundance of thatching material and a lack of walling material such as in grassland environments. In the wooded lowland environments and stony uplands of northern Britain, the majority of prehistoric structures were more likely to be of the walled variety. The dome-and-cylinder type remains hypothetical (see 4.2.2). The beehive-and-cylinder type is a possibility in prehistoric Britain; due to its weak eaves, it is not however a type adapted for a temperate environment. The cone-and-cylinder type is seen as the main prehistoric house type: that best suited to a temperate climate.

Fig. 4.50 reveals the excavated frequency of different wall types in the dataset. More than one in four structures had contiguous timber walls; one in four had stone walls; and one in five were post-built. Just one in sixteen had a stake wall, however it has been suggested that not all stake-rings represent the remains of a roofed structure. One in twenty structures had a turf or daub wall. The real number of this type may be much higher as a significant proportion of the 10% where wall-type is unknown may represent such a decayed wall. Just one in thirty-three structures consisted of a stone and/or earth ring-bank. Chronologically (fig. 4.51), the most

period-sensitive wall types are the stone ring-bank (ErBA), the stake wall (LBA-EIA), and the stone wall (RIA), but they are not exclusive to these periods. Contiguous timber walls are most popular in the 1st millennium BC. Structures with no evidence for wall-type increase in frequency during the LBA, at the same time as the origins of the turf wall (fig. 4.52). There also seems to be a shift from ring-banks employing stone bank foundations to either those without a stone element or to those with a stone *wall* foundation towards the end of the Bronze Age.

Regionally, stone walls are most popular in the North Wales and the North Sea regions, as are ring-bank structures. Contiguous timber walls are most popular in the Irish Sea region. Stone-built structures are rare in the Yorkshire Pennines and the Midland Plain where use of hurdles – and interestingly structures where evidence for wall type is absent – are popular. Stake walls are most popular in North Wales and the Midland Plain (fig. 4.55). Fox's (1932) geographical division of Britain into a highland and lowland zone is still being used to misinform us about the choice of building materials in Britain (fig. 4.54). In this model, all of northern and much of central Britain is part of the 'highland zone'. Such a division has long been considered misleading (Ralston 1979, 446). The use of materials is more complex – and culture-specific – than simply a reaction to availability, for example, stone is rarely used in the stone-rich area of the Pennines. The implication that the wall-slot may be more popular in northern Britain because of the difficulty of digging postholes in harder geologies (Harding 1974, 41) is also found to be invalid at this level of study, with post-built structures in fact most popular in Highland Scotland.

Fig 4.56 shows structural type through time. In the later Neolithic the simple-ring structure is the most popular form at c. 70%. Does this represent small households? Double-ring structures may be over-represented during the LrNeo-EBA period after the current author's re-dating of Rennie's structures (see Appendix 2). Throughout the 2nd millennium BC, the double-ring structure grows in popularity reaching a c. 70% peak in the MBA. Has household size increased? The period 1000-800 BC sees their decline. In the EIA there is a new peak in both double- and triple-ring structures. Throughout the later 1st millennium BC the simple-ring is again slightly more popular (c. 70%). Is there greater architectural knowledge regarding the capability of the S-R design or have social forms changed? In the RIA, the simple-ring structure is at c. 80 % because of the trend at this time for small stone-walled structures. The data reveals a clear correlation between region and structural type with simple-ring structures being more common in the south of the study area and double- and triple-ring structures more common further north (fig. 4.57). This does not, however, correspond with regional house sizes (see fig. 4.60).

Chronologically, house size hovers around the 8 m mark throughout prehistory (fig. 4.58). Only at three points is there a marked change. In the later Neolithic the average is more than 1 m below average at 6.7 m. The small number of structures of later Neolithic date, however, has led to distortion in the figures. The later Neolithic dataset comprises only 11 structures from 6 sites and the average is brought down by two very small, oval, bedrock-utilising structures at Auchategan in Highland Scotland (Marshall 1977-78). In the LBA-EIA – where the dataset is more secure – the average house size increases to 10.4 m. LBA-EIA size increase corresponds well with the increased popularity of the triple-ring structures at this time. Secondly, there is a slightly more marked decrease in house size during the Roman Iron Age as the average house diameter falls to 7.2 m. RIA size decrease corresponds with the increase of simple-ring structures to 80% of the whole at this time. The most popular house-type in the RIA was the stone-walled simple-ring structure. Was the move from timber to stone conditioned by a decrease in household size or did the trend for stone – perhaps after decline in timber resources – enforce a decrease in living space? Had settlement space fragmented at this time with different structures undertaking different functions? By looking at change in house area (fig. 4.59) we see two significant peaks in the data. The most dramatic at c. 800 BC, the second during the later 1st millennium BC. Regionally, it is Highland Scotland and the Yorkshire Pennines which have significantly larger houses (fig. 4.60).

Following Little Woodbury, the large EIA house was accepted as a type-fossil of the British Iron Age (Hodson 1964). It is now common practice when discussing Iron Age houses to focus on Little Woodbury, Longbridge Deverill Cow Down, and Pimperne as type-sites in the south, with Scotstarvit Covert, West Brandon and West Plean as their northern counterparts (Harding 1974; Hill 1995b). However the received interpretation of Little Woodbury (Bersu 1940; Musson 1970a), Scotstarvit (Bersu 1947-48a), Milton Loch (Piggott 1952-53), West Plean (Steer 1955-56), Ballacagen-Ballanorris (Bersu 1977), and Longbridge Deverill (Chadwick Hawkes 1994) has been questioned elsewhere in the study (see 4.2.3, 4.2.4 and 5.3.4). These houses were actually no larger than others of their time, they simply enclosed their external eaves-space. As a result, the interpretation of a small number of circular structures (at Broxmouth, Old Oswestry, and West Plean) which received large roundhouse status on entry into the database, can now be questioned. Such low numbers, however, mean that the overall pattern remains unaffected.

Fig 4.61 reveals a general, marked trend towards circular – as opposed to oval – shaped structures through time (contra Walton 1952). Oval/sub-oval structures are at their most common (60%) during the later Neolithic – and it is at this time that sub-oval structures in particular are at their highest level. Following the later Neolithic, the numbers of oval/sub-oval structures are in steady decline and have fallen by 20% at the end of the MBA. During the LBA-

EIA period there is a marked trend towards true circularity – coinciding with size increase - with one in two structures now circular. The proportion of truly circular structures falls off again during the EIA period but nevertheless remains relatively high (c. 30%) compared to early prehistory (10%). By the LrIA, a relatively stable architectural tradition exists where seven in ten structures are circular: almost a reverse of the situation in the LrNeo. There is little variation regionally (fig. 4.62), except perhaps in the north and west where there is a lower proportion of circular structures than elsewhere and a higher number of oval structures. Is this a result of the highland topology or a reflection of cultural differences? The oval has been revealed as a less stable form (4.2.4) and the steady decline in numbers of oval structures from the late 3rd to the early 1st millennium BC presumably signals the gradual rejection of the oval shape as a design concept.

61% of structures in northern Britain display symmetry in their groundplan (two-thirds of which was axial), compared to just 21% of MBA structures in southern England (Brück 1999a). Post-ring symmetry appears to have been around as a design concept since the LrNeo (fig. 4.63) – although the current author's loose re-dating of Rennie's (1997) structures may be a problem here (see Appendix 2). The incidence of post-ring symmetry peaks in the LBA and, contrary to popular belief, there is actually a *decline* from the LBA onwards (contra Harding 1974, 46-8; Cunliffe 1978, 175), with three particularly sharp periods of decline: c. 1000 BC, c. 400 BC, and c. AD 50. Radial symmetry is popular in the earliest examples but this decreases rapidly in favour of axial symmetry which peaks in the MBA. Axial types decline again at c. 1000 BC then rise to an EIA peak; falling again at c. 400 BC; rising again in the LrIA then a sharp decline again at c. AD 50 with an equally rapid increase again in the RIA. There seems to be little regional variation in the use of post-ring symmetry (fig. 4.64), with a slight trend in popularity from north to south. There is an interesting pattern in the *type* of post-ring symmetry (although low numbers may distort): whilst axial symmetry is most popular in general - especially in the North Sea Region and North Wales - radial symmetry is popular in the Irish Sea and Midland Plain Region.

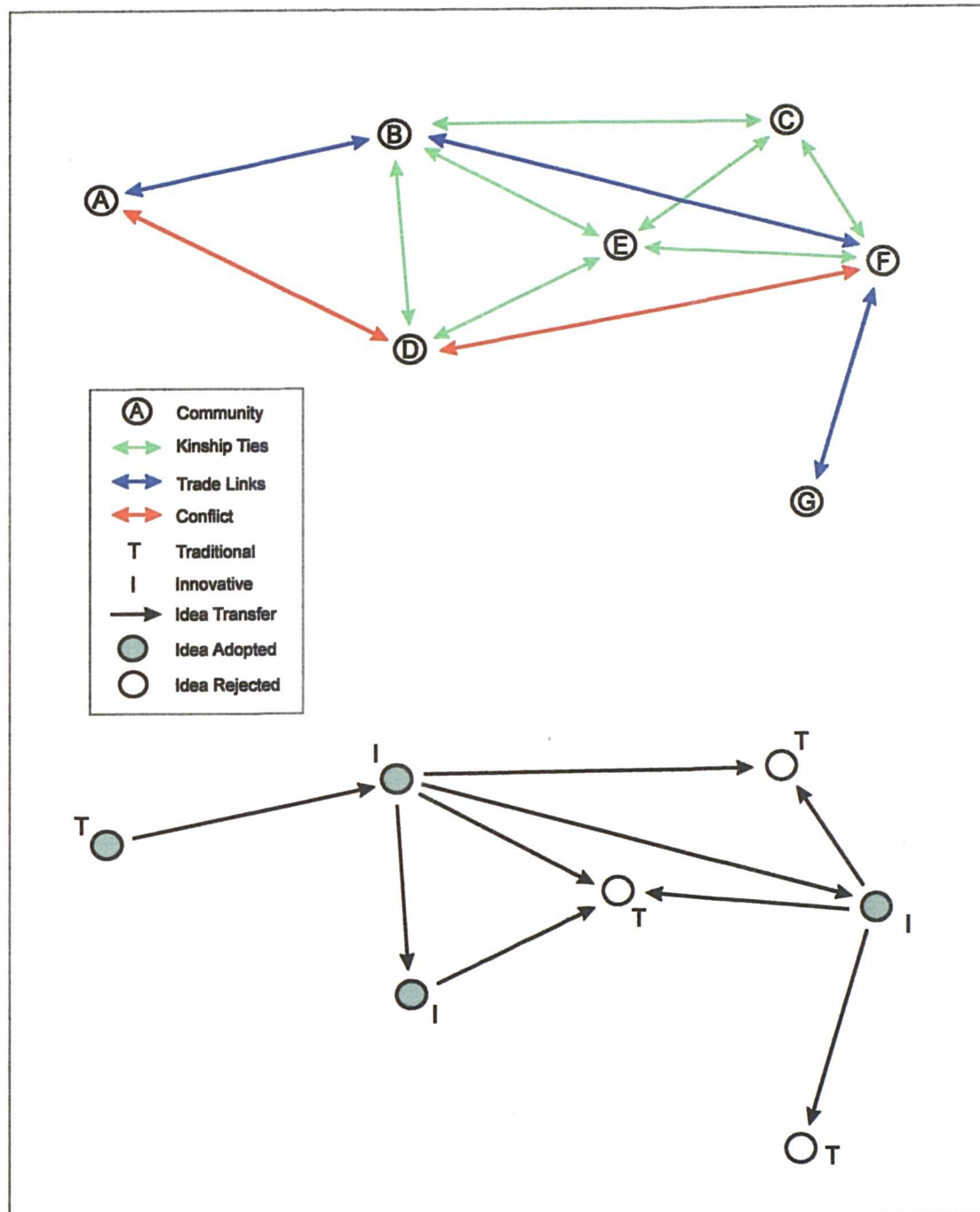


Fig 4.1 A hypothetical model to explain the transfer of ideas between communities




1		Rigid elements
2		Flexible elements planted in the ground at one end
3		Flexible elements planted at both ends

Fig 4.2 Cipriani's (1938) typology of traditional Ethiopian circular structures (after Gebremedhin 1971)









1		Round plan; diameter less than height; walled with mud and/or stone; often with stone foundations; thatched roof (conical or trumpet-shaped)
2		Round plan; diameter approximately equal to height; roof of poles leaning against central framework; poles sometimes encased in dry stone work at base; thatching of grass or turves
3		Round plan; diameter equal to or greater than height; walls of mud and/or wattle; thatched conical roof (convex or concave profile); often with verandah full or part way round
4		Round or oval plan; with hemispherical profile; basic framework of hoops; covering of skins, mats and/or thatch of grass, leaves or mud over brushwood; can usually be dismantled
5		Round plan; conical roof and no walls; framework of straight sticks; sometimes thatched
6		Round plan; framework of flexible poles embedded in ground, tied at top; 'beehive' type; usually slightly convex profile; thatch usually of grass or reeds (stepped or plain); sometimes internal low perimeter wall; sometimes central support; often divided by internal partitions; often with porch
7		Oval plan; asymmetrical peaked thatch roof supported by conical mud pillar and mud arch; walls of mud and wattle
8		Oval plan; mud and/or wattle walls; thatched saddle-back roof with semi-conical ends

Fig 4.3 Denyer's (1978) classification of African circular structures

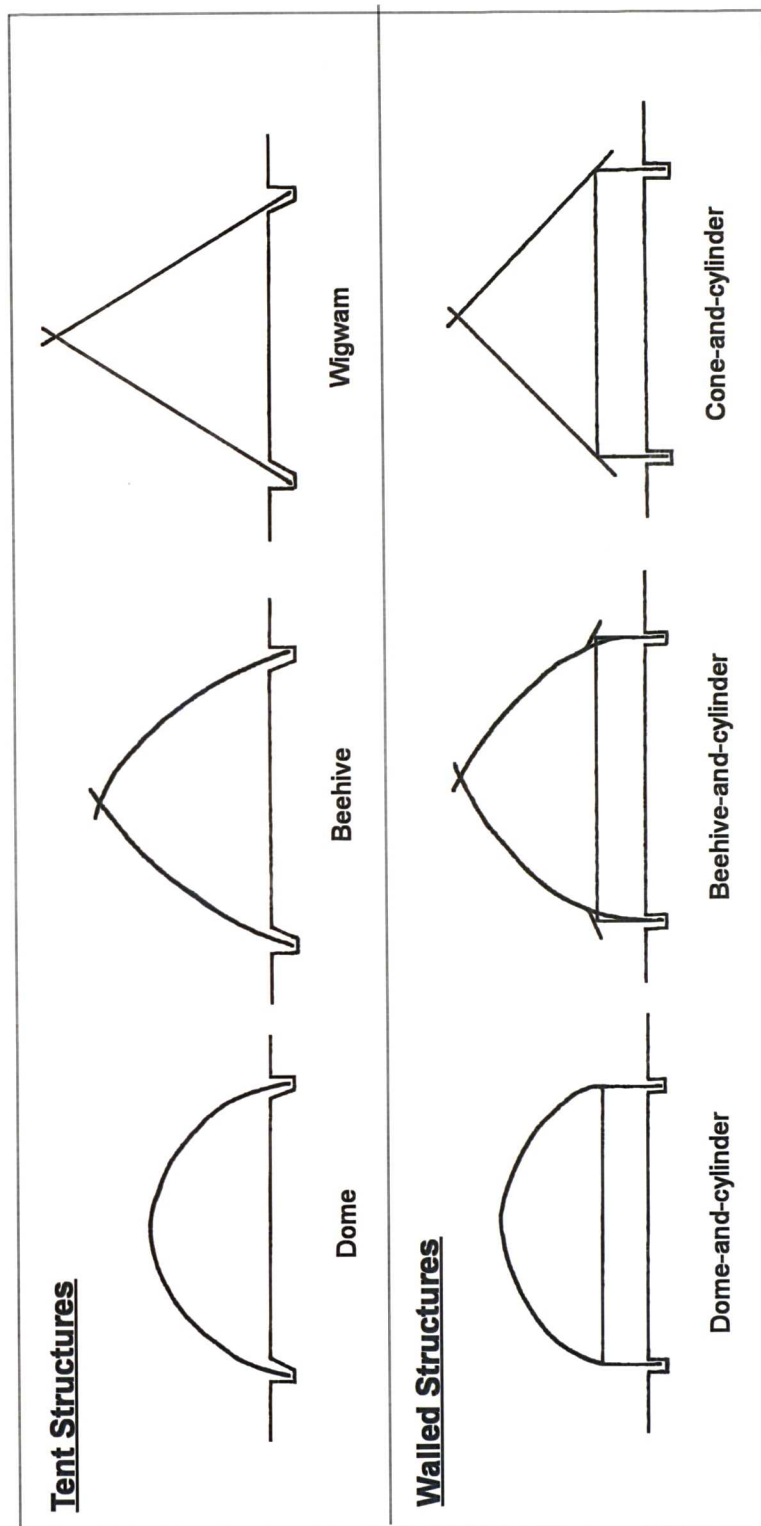


Fig 4.4 Circular house types

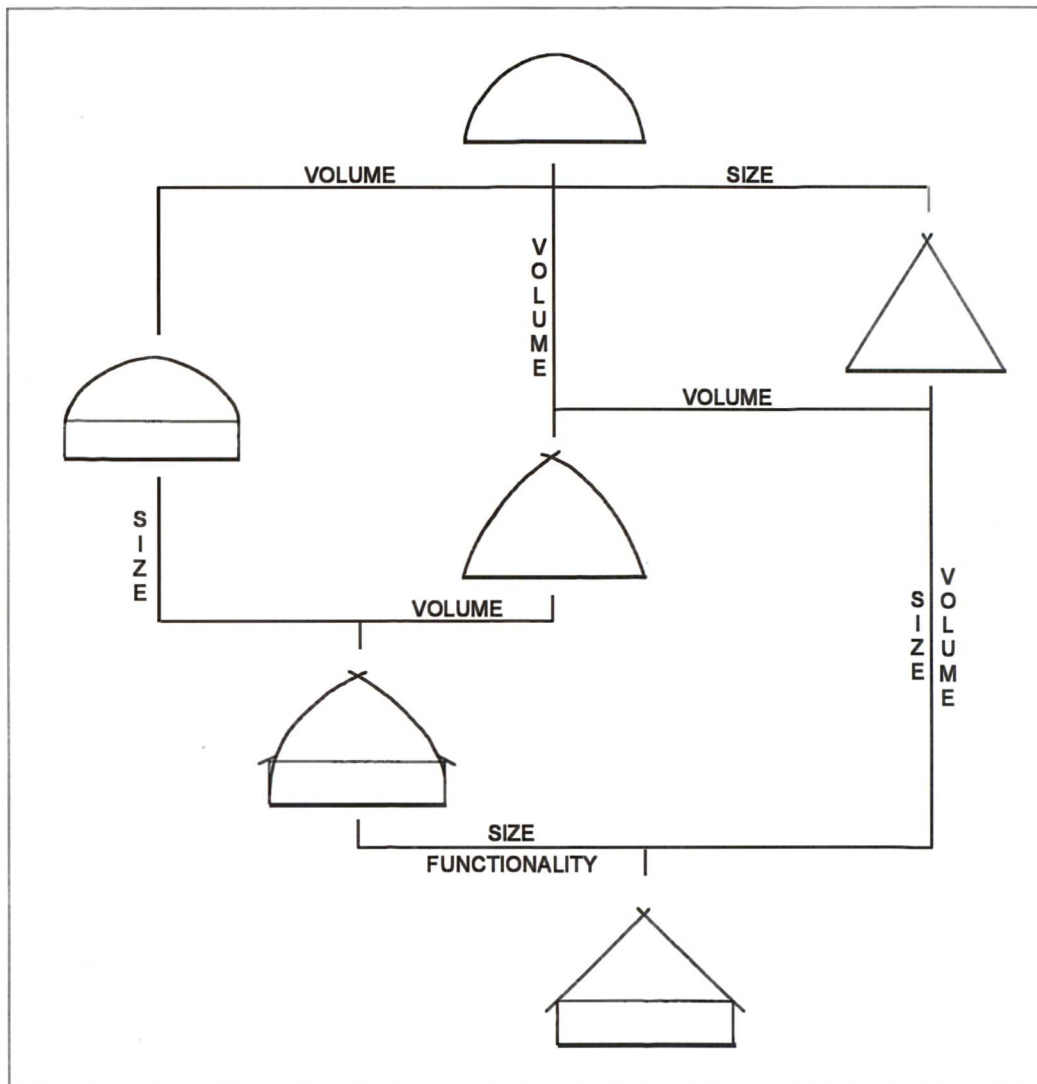


Fig 4.5 Solutions to basic design problems in circular architecture

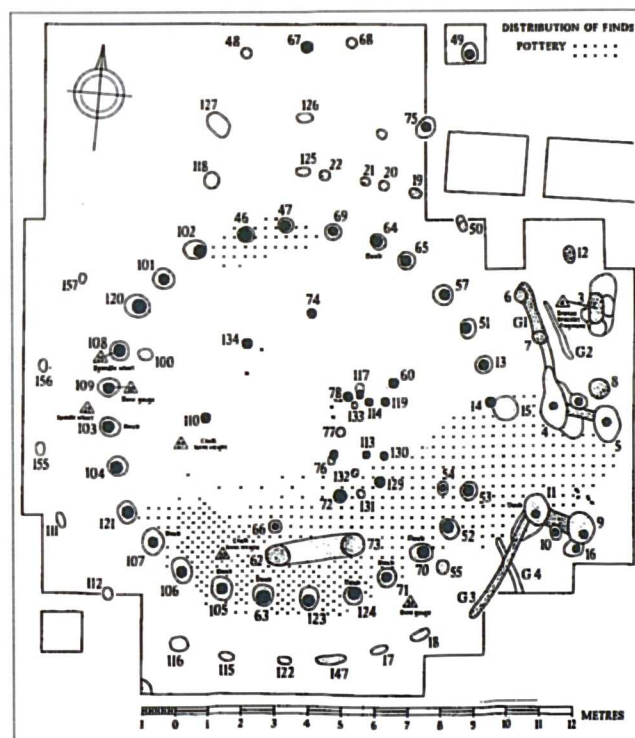
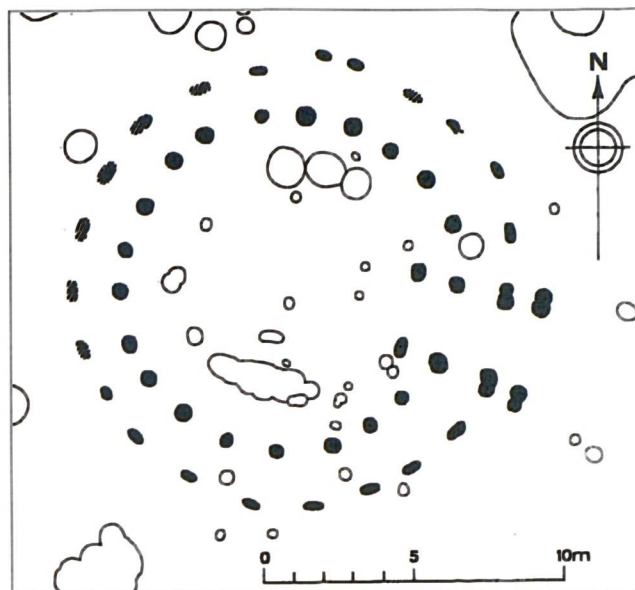


Fig 4.6 Little Woodbury CS I and Longbridge Deverill Cow Down CS 3 (after Musson 1970a; Chadwick Hawkes 1994)

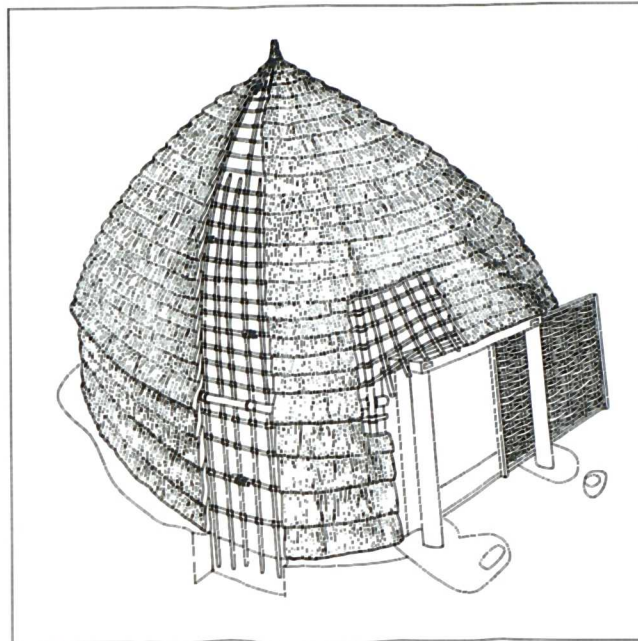


Fig 4.7 A Danebury stake-built structure as a beehive-and-cylinder type (after Cunliffe & Poole 1991)



Fig 4.8 Crawcwell West CS J1 (after Crew 1998)
Scale 1:100

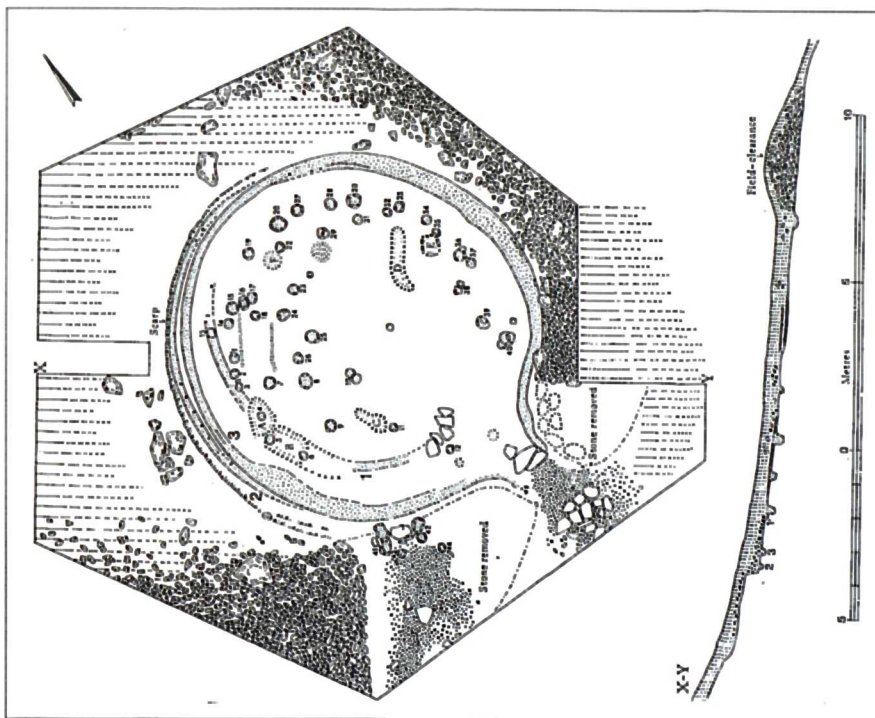


Fig 4.9 Green Knowe Platform 2 (after Jobey 1978-80)

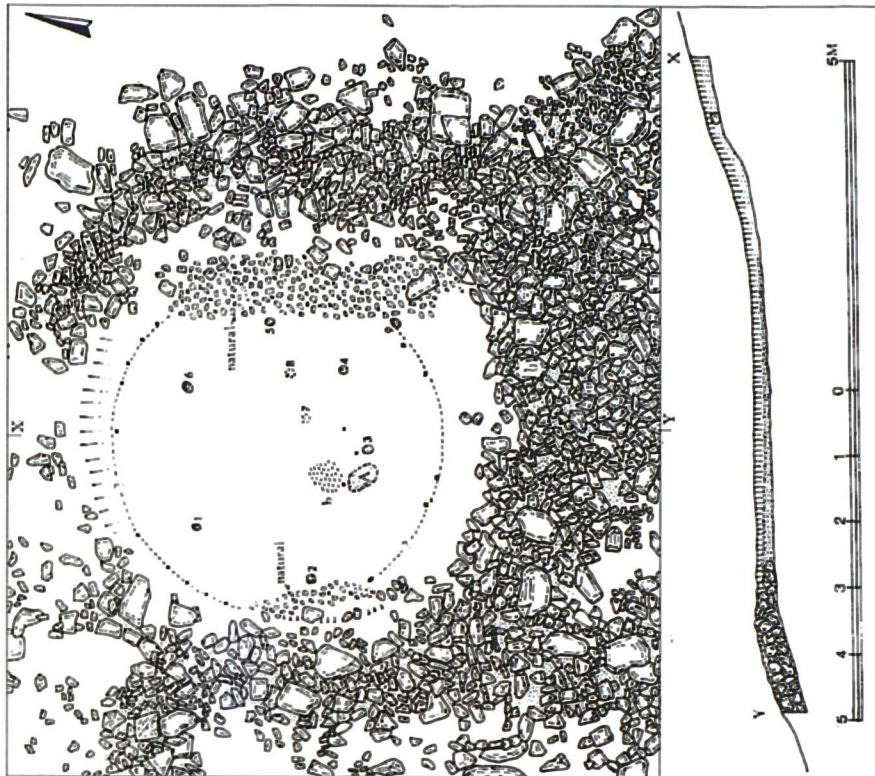


Fig 4.10 Standrop Rigg CS 2 with post-abandonment clearance preserving the line of the turf wall (after Jobey 1983)

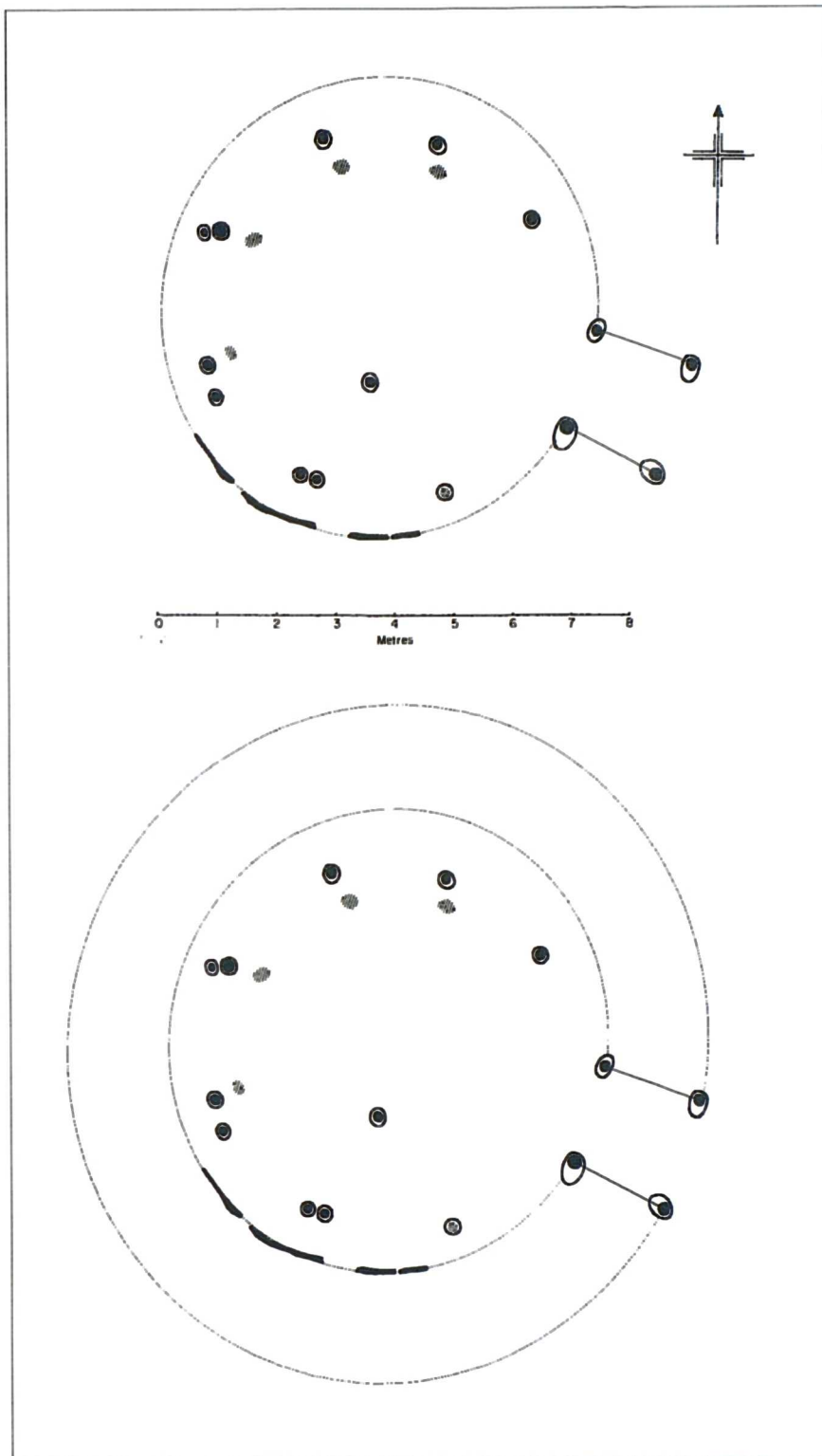


Fig 4.11 Moel y Gaer CS P-R9 as a timber-walled double-ring with porch and as a turf-walled structure with internal wattle lining (after Guilbert 1976)

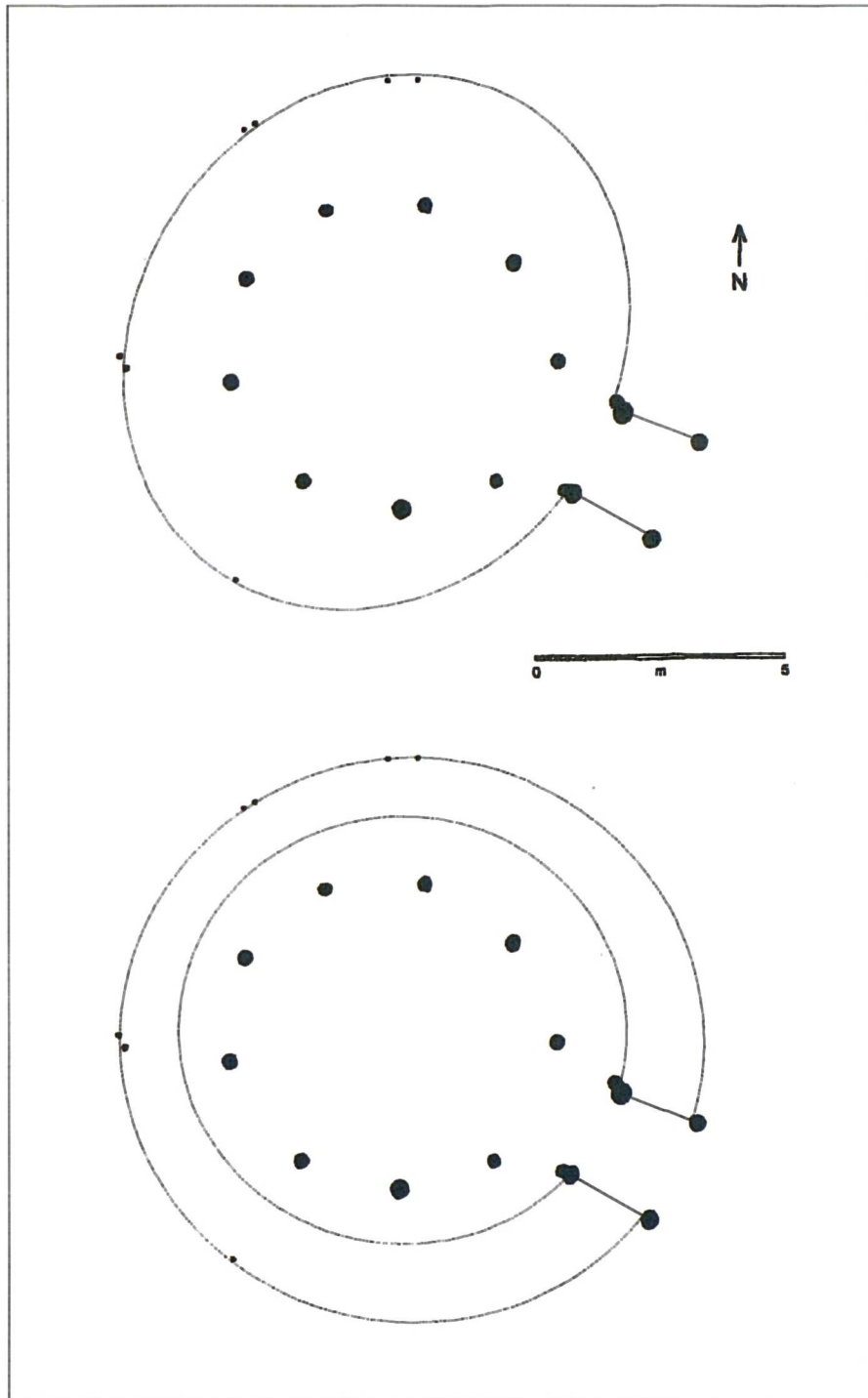


Fig 4.12 Moel y Gaer CS P-R16 interpreted as a stake-walled double-ring with porch and as a turf walled structure (after Guilbert 1976)

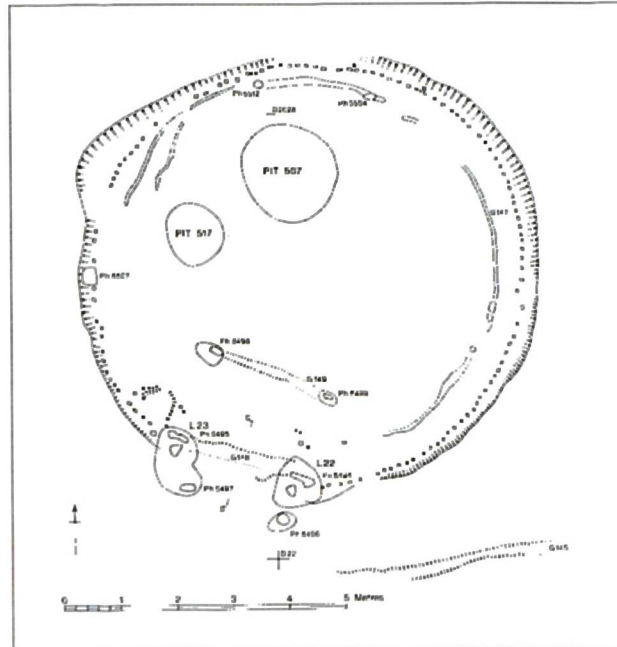


Fig 4.13 Danebury CS 20 (after Cunliffe & Poole 1991)

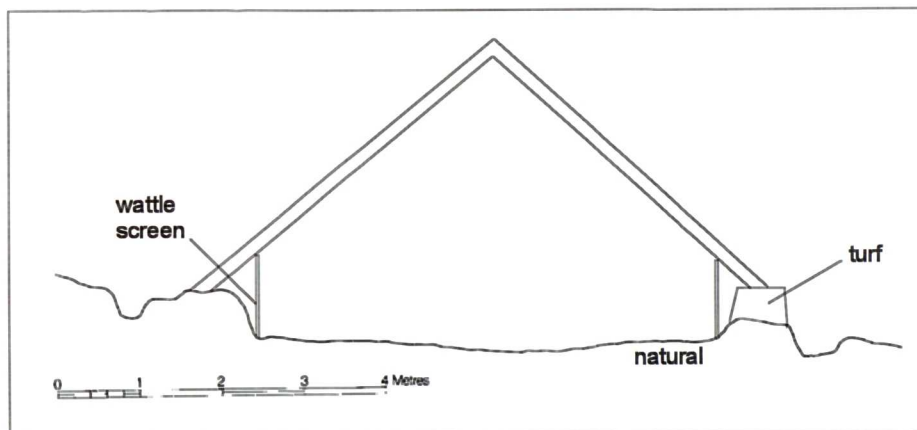


Fig 4.14 An alternative reconstruction of Danebury CS 28 (after Cunliffe & Poole 1991)

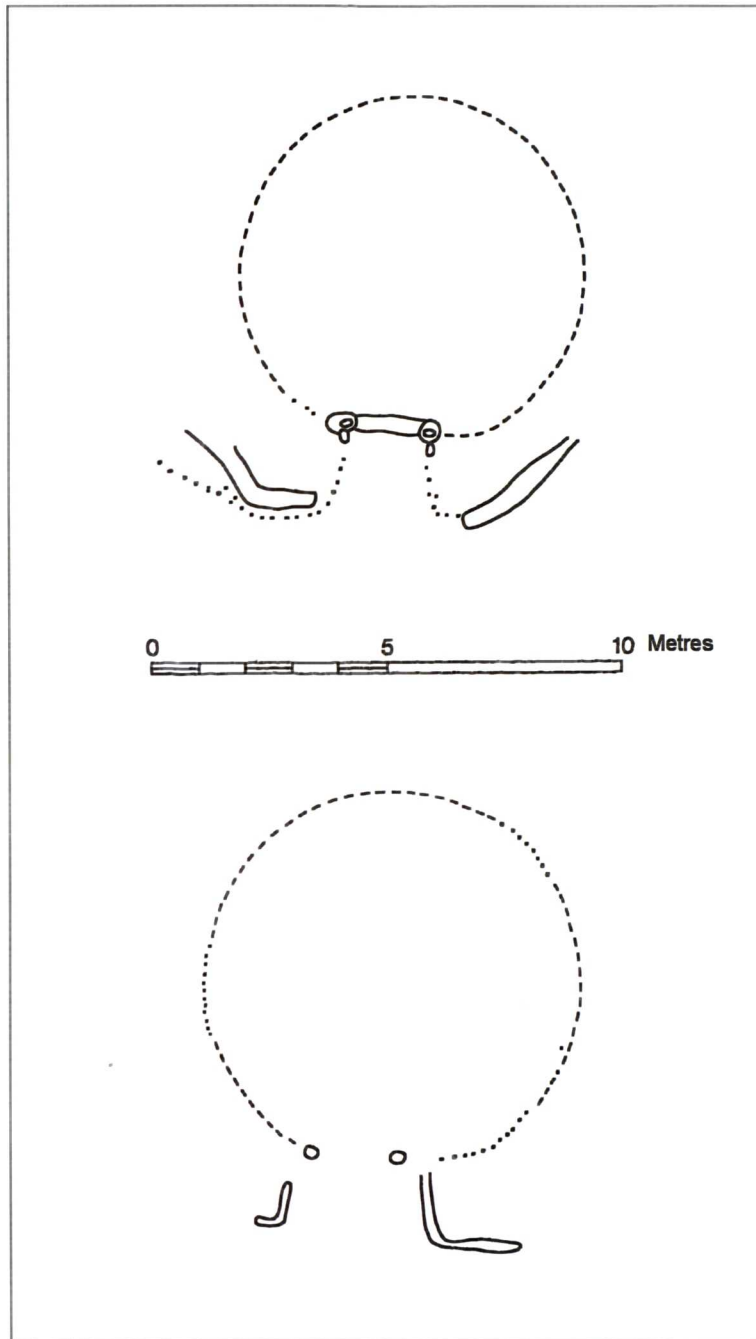


Fig 4.15 CS14 and CS15 at Danebury with the outline of a turf wall preserved at each (after Cunliffe 1984)

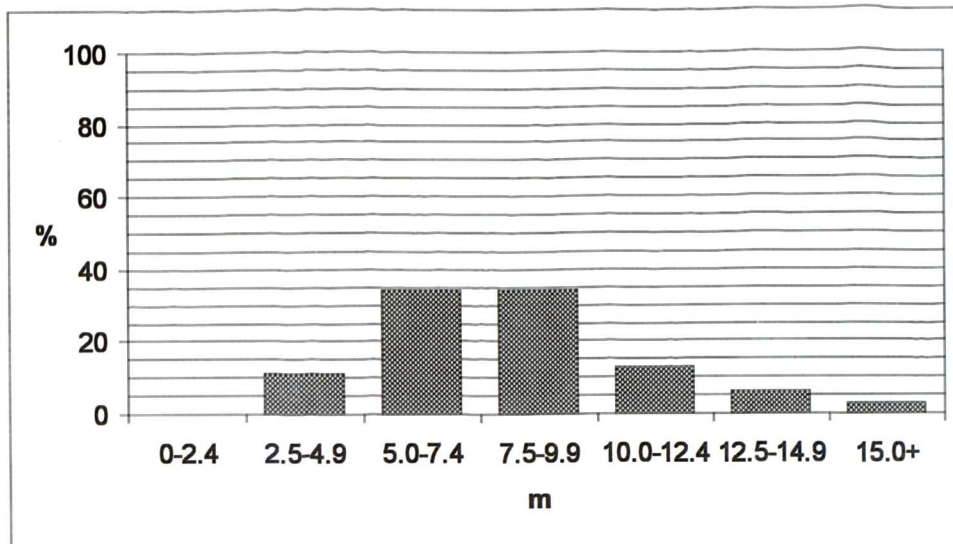


Fig 4.16 Size range of prehistoric circular structures in northern Britain

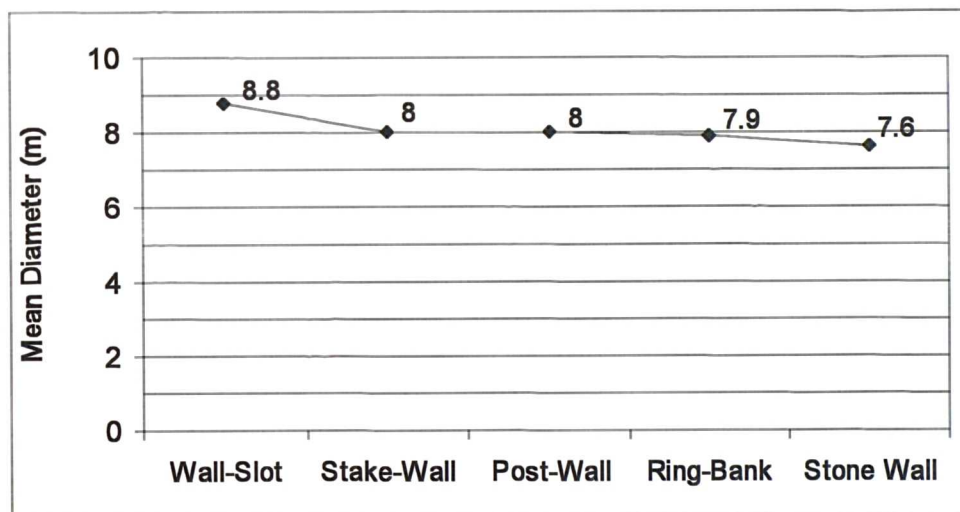


Fig 4.17 Mean diameter according to wall type

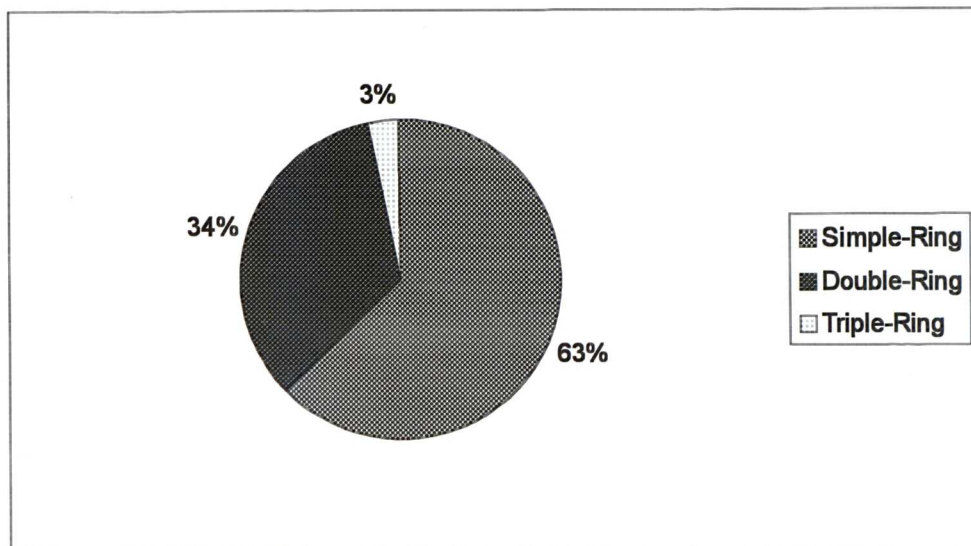


Fig 4.18 Structure type in northern Britain

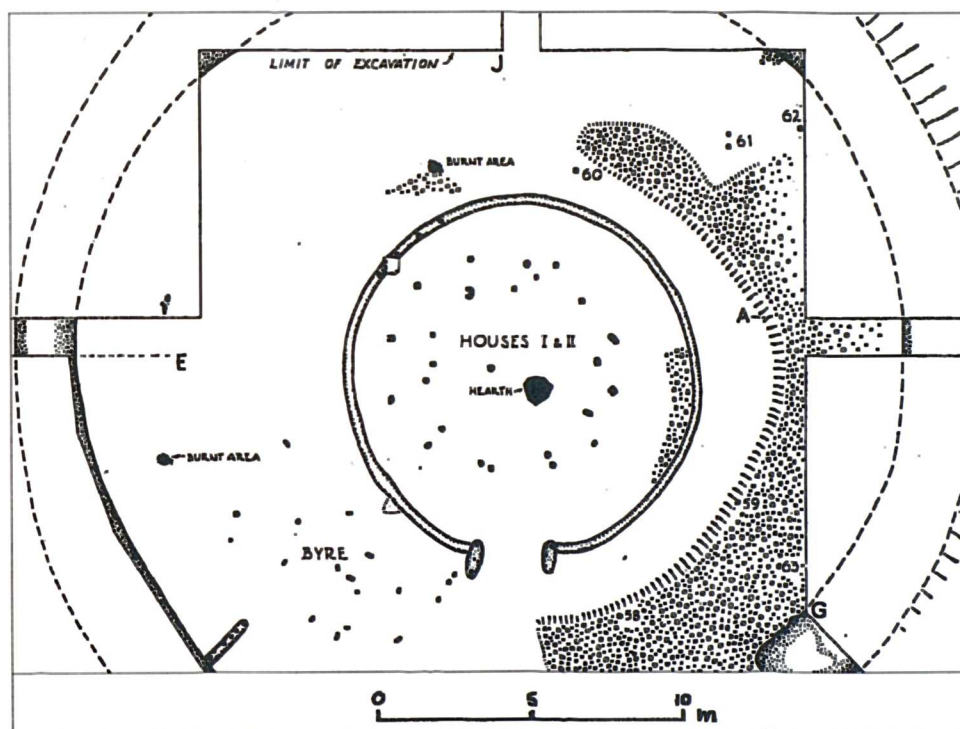


Fig 4.19 West Plean (after Steer 1955-56)

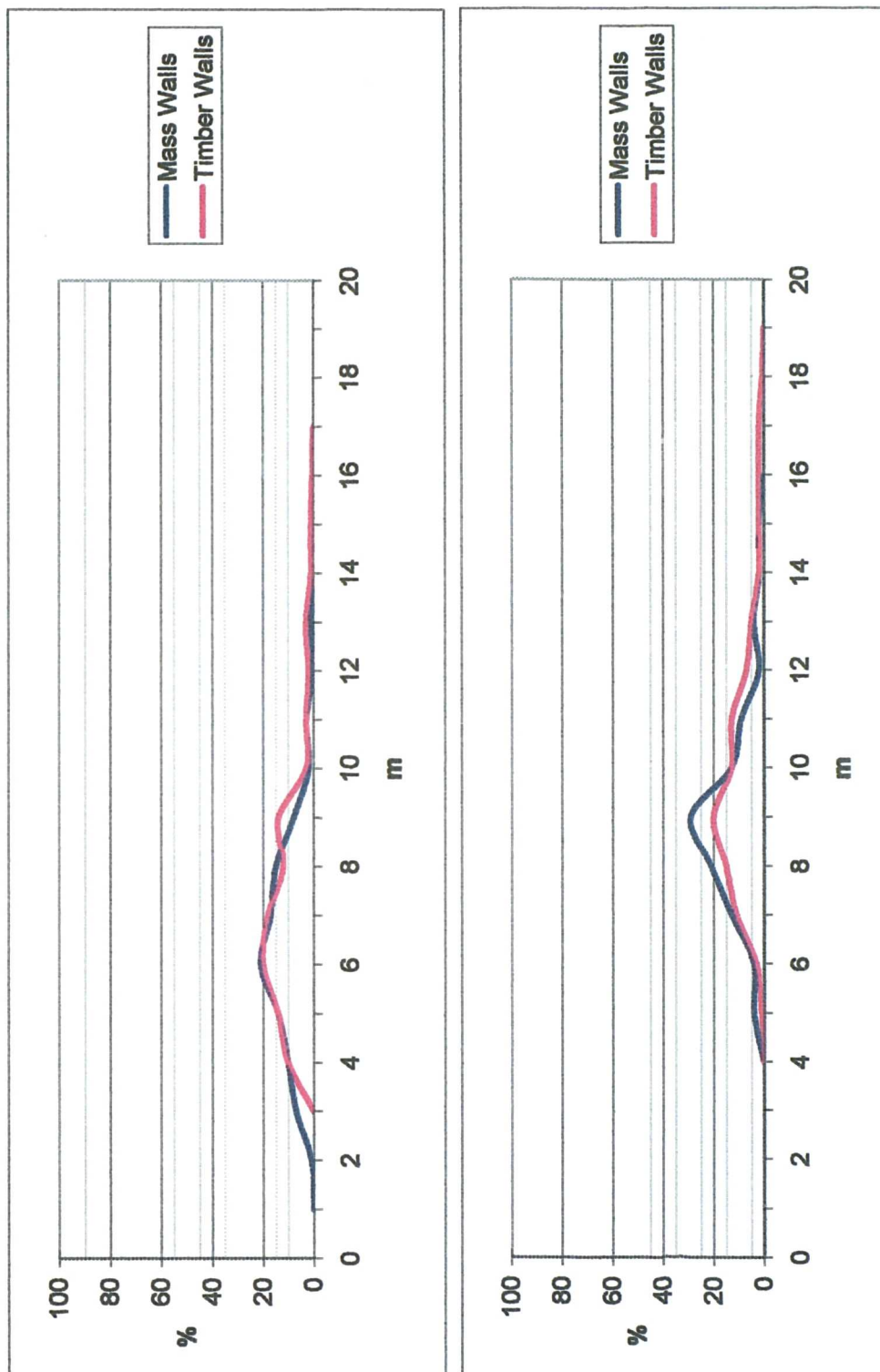


Fig 4.20 Size range in simple- and double-ring circular structures

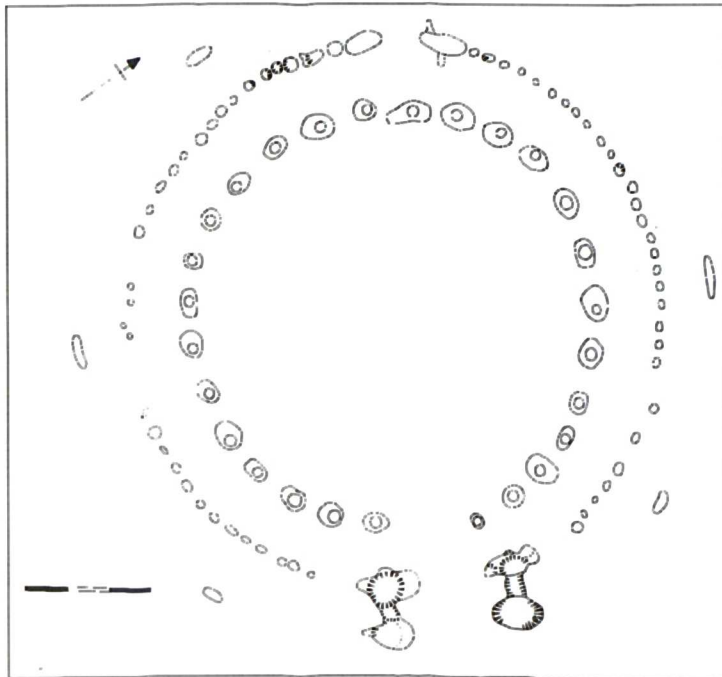


Fig 4.21 Pimperne (after Reynolds 1979)

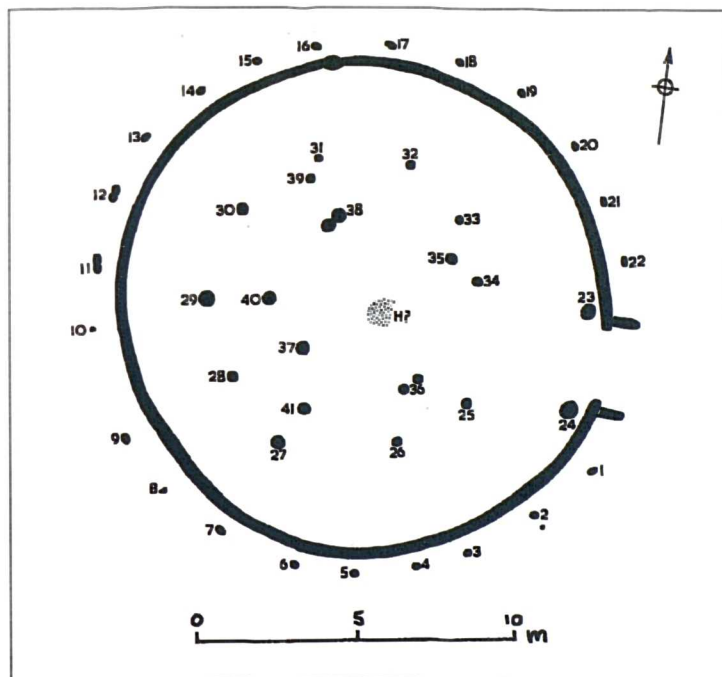


Fig 4.22 West Brandon CS B (after Jobey 1962)

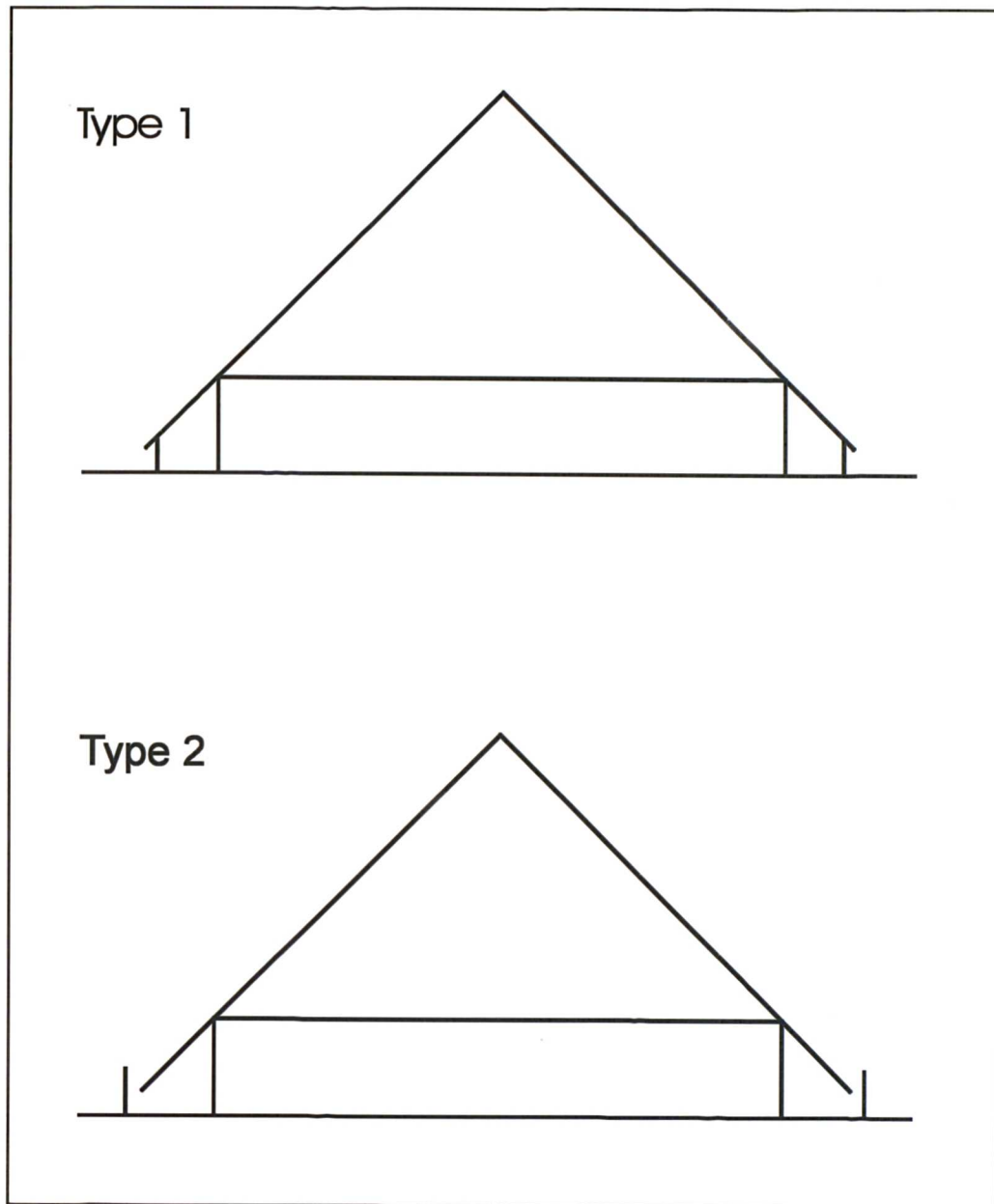


Fig 4.23 Double-ring structures: non-structural outer rings

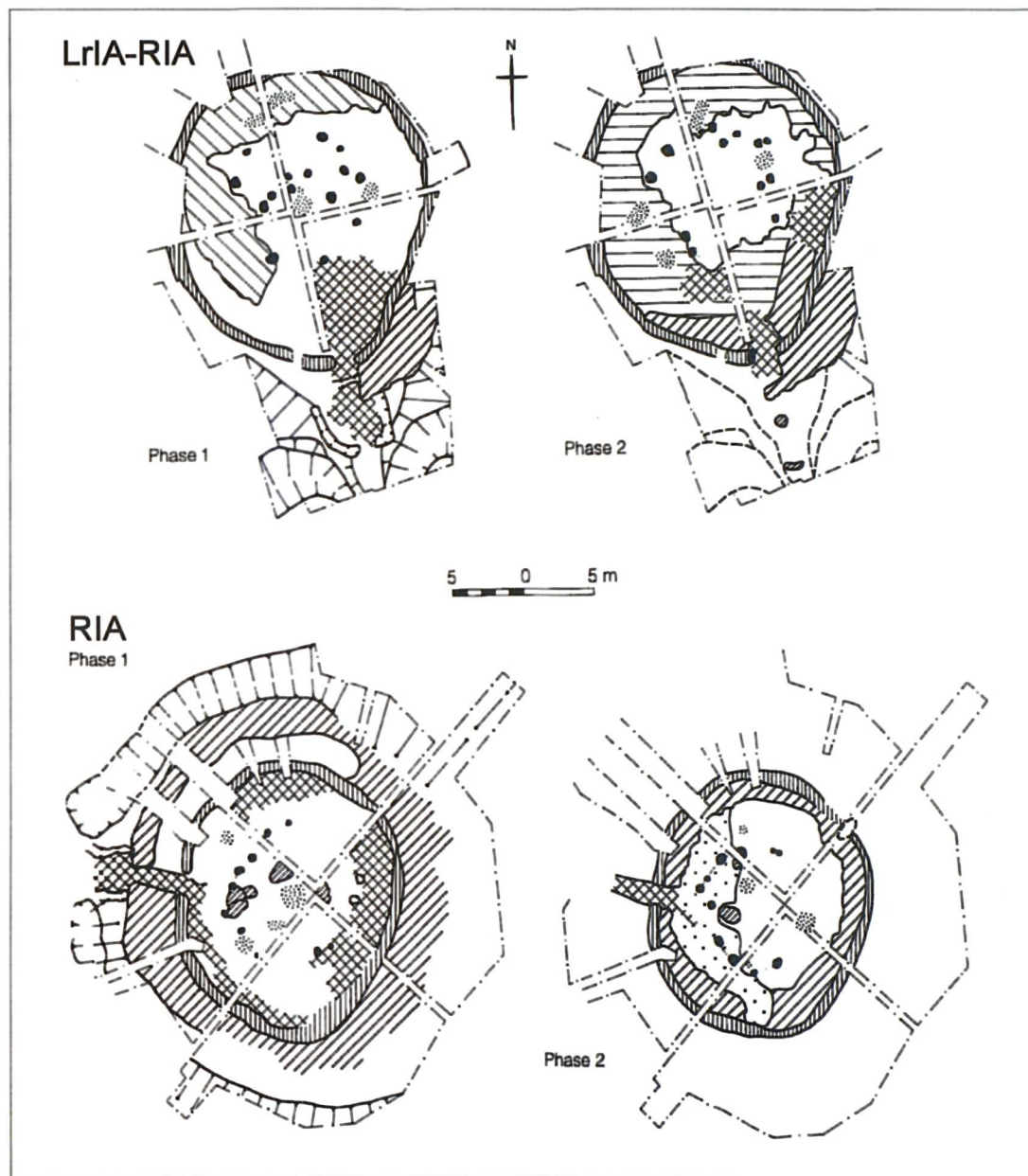


Fig 4.24 Structural changes at Aldclune (after Hingley *et al.* 1997)

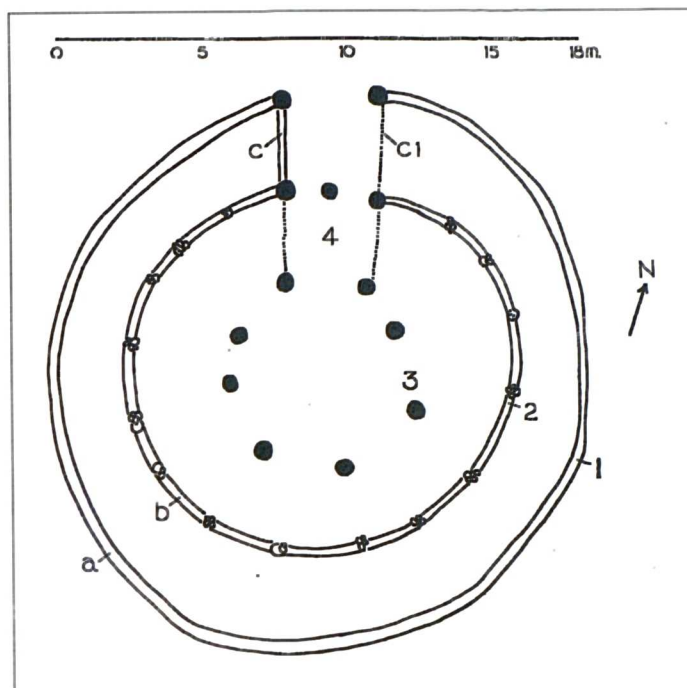


Fig 4.25 Scotstarvit Covert (after Bersu 1947-48a)

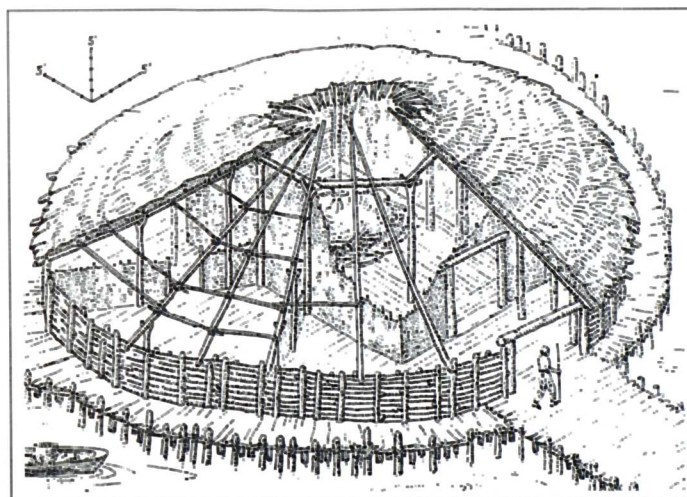


Fig 4.26 Piggott's (1952-53) reconstruction of Milton Loch

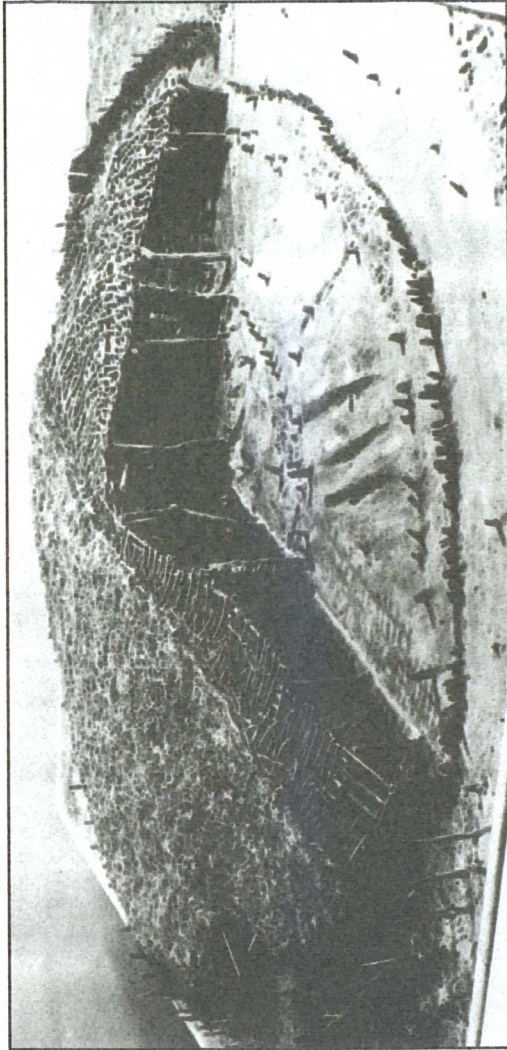


Fig 4.27 Bersu's reconstruction model of Ballacagen Lough A Phase I (Source: Bersu 1977)

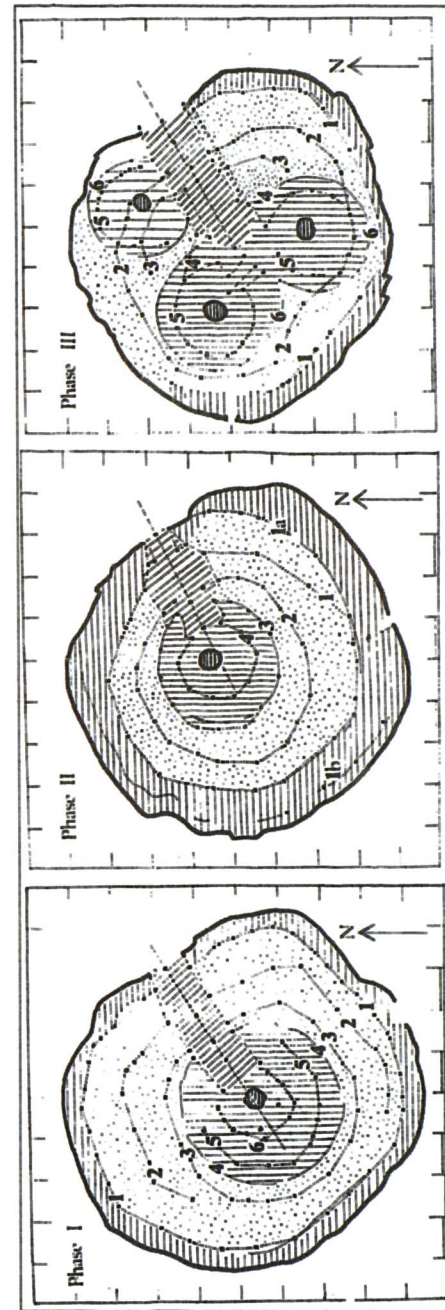


Fig 4.28 Bersu's 'zone diagrams' for Ballacagen Lough A (Source: Bersu 1977)

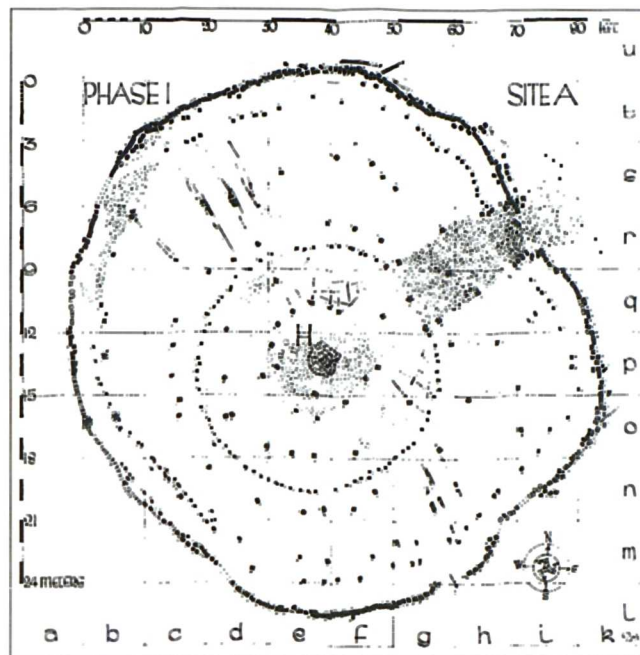


Fig 4.29 Ballacagen Lough A Phase I (Source: Bersu 1977)

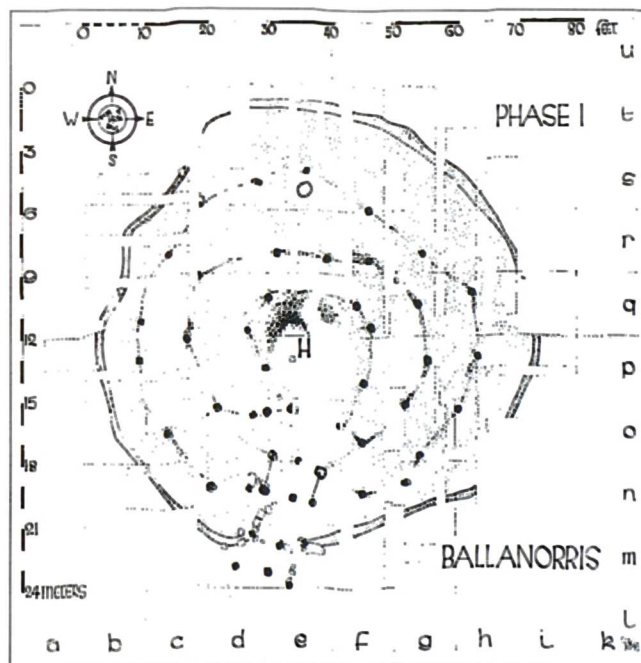


Fig 4.30 Ballanorris Phase I (Source: Bersu 1977)

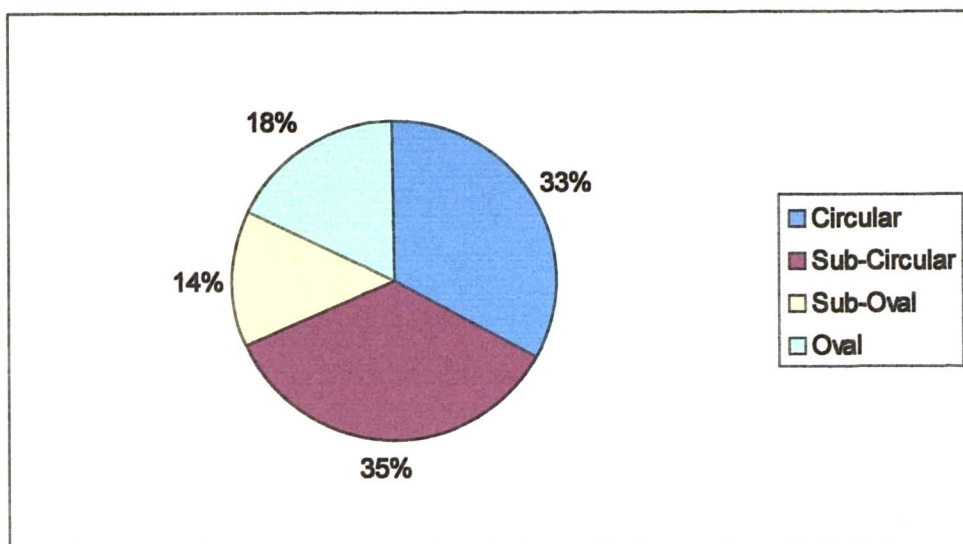


Fig 4.31 Shape of circular structures in northern Britain

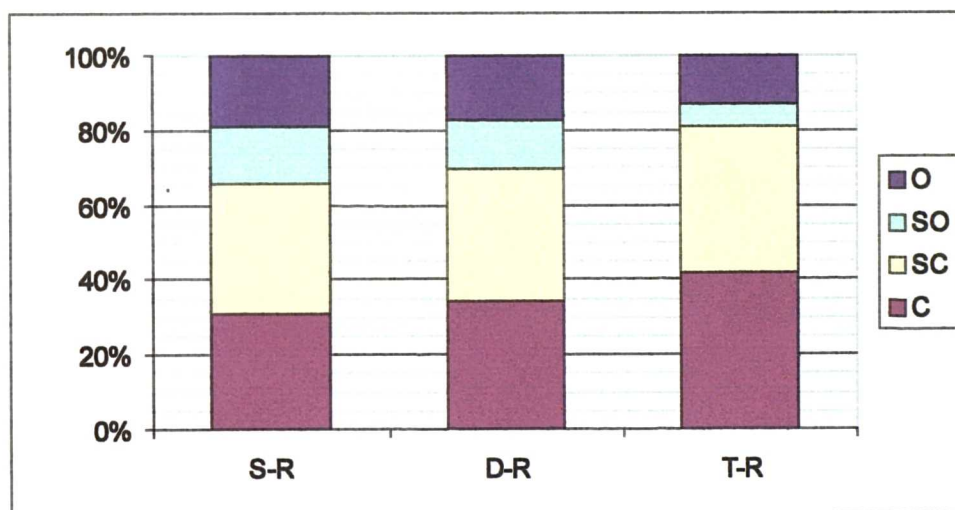


Fig 4.32 Structure type and shape

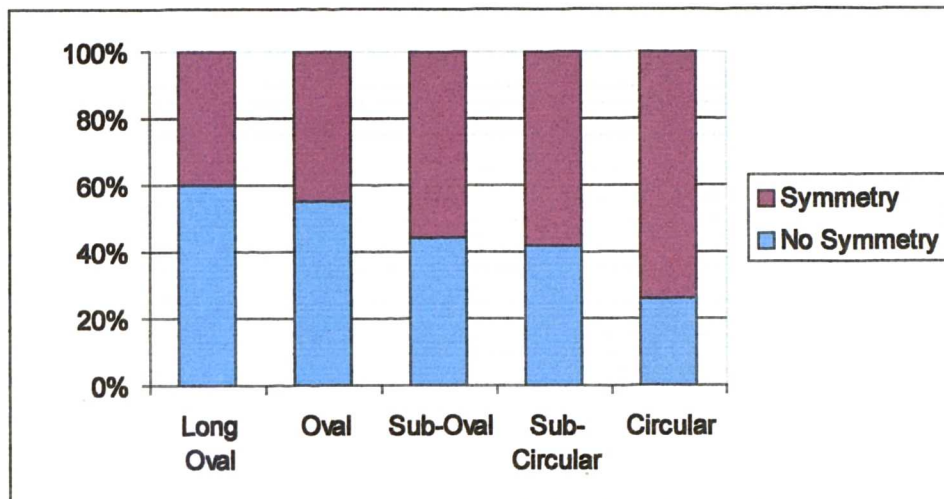


Fig 4.33 Structure shape and post-ring symmetry in double-rings

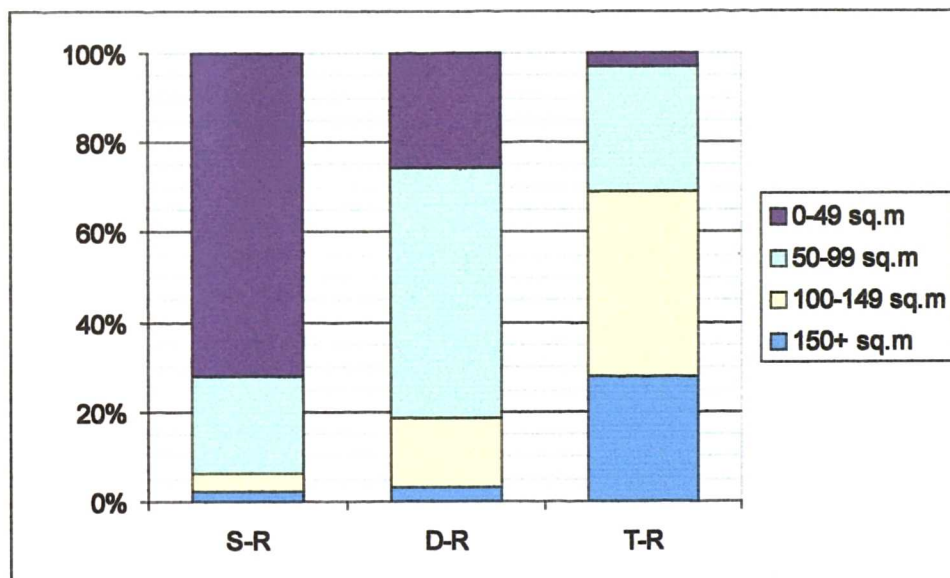


Fig 4.34 Structure type and size

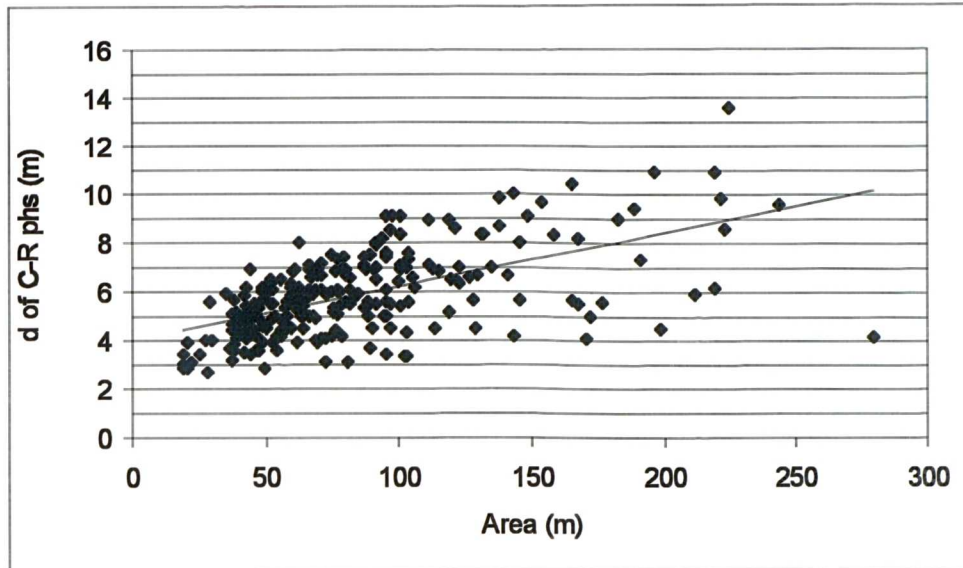


Fig 4.35 Depth of C-R postholes and structure size

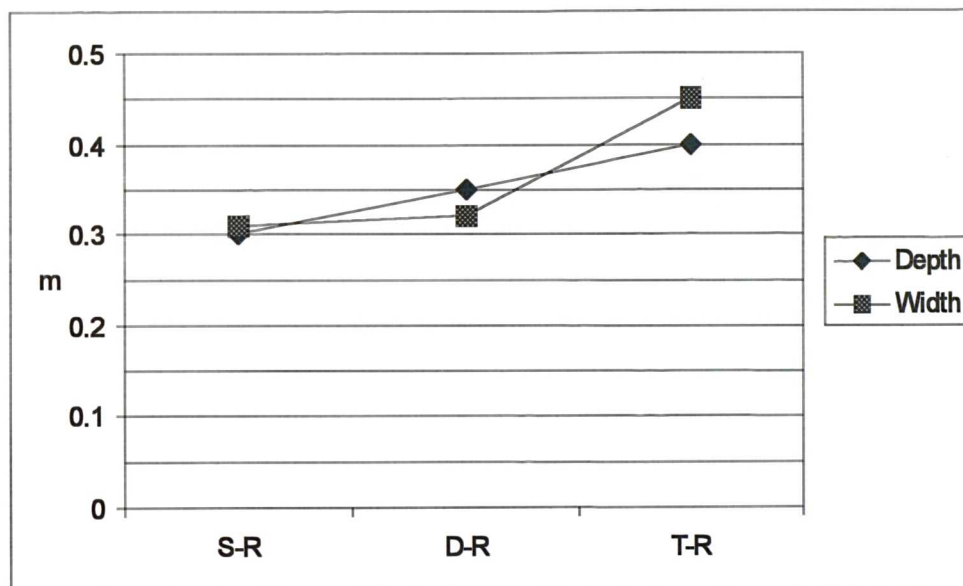


Fig 4.36 Mean dimensions of outer wall cut features and structural type

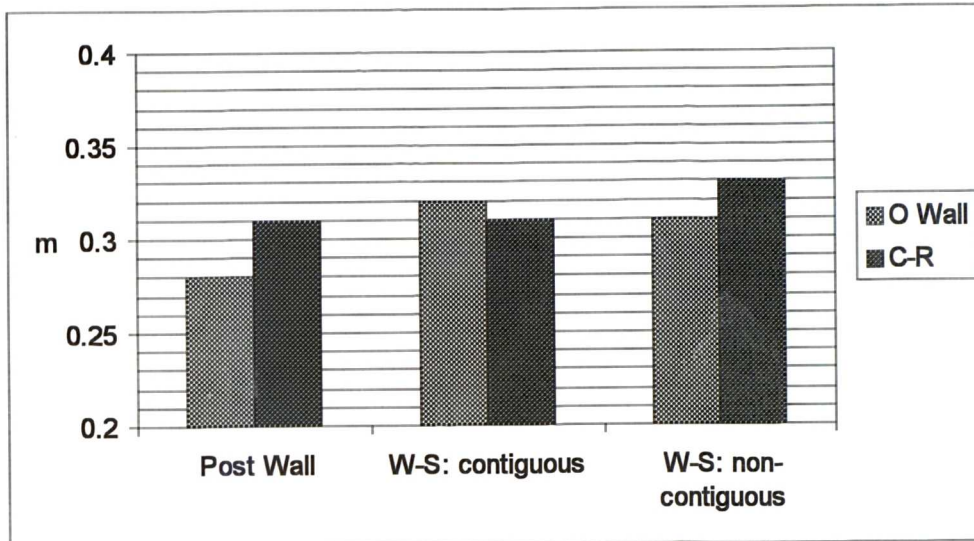


Fig 4.37 Width of outer wall and C-R cut features

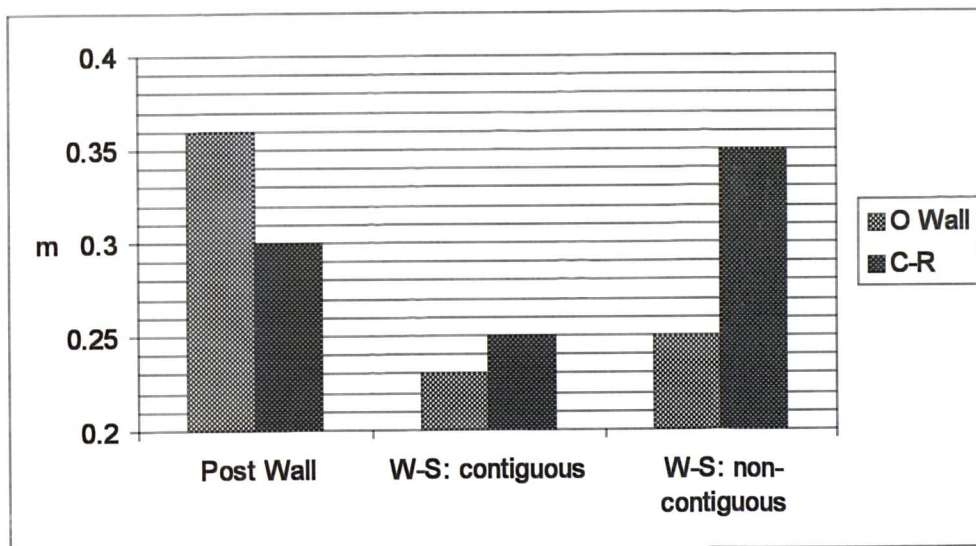


Fig 4.38 Depth of outer wall and C-R cut features

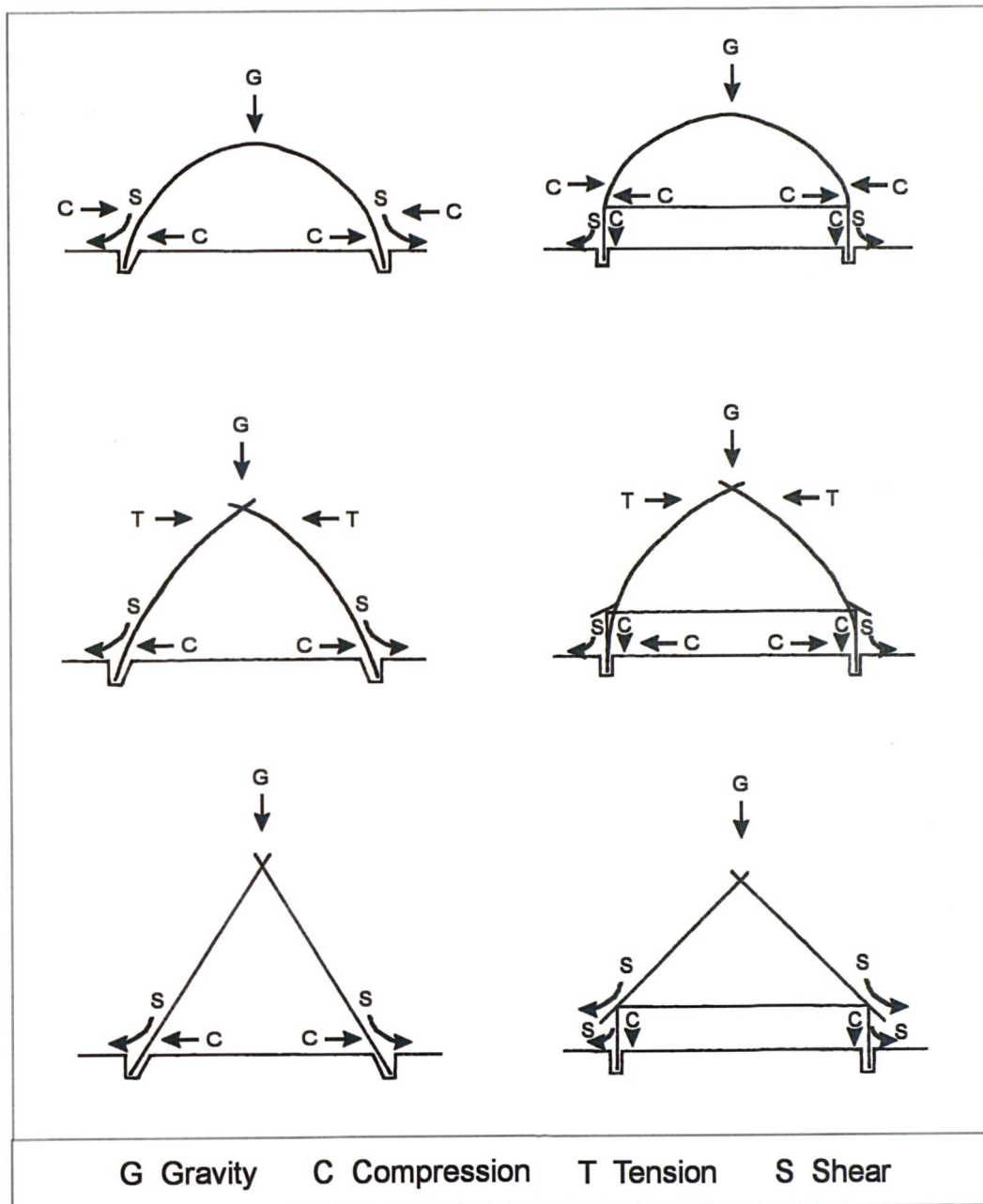


Fig 4.39 The stresses inherent in circular house types

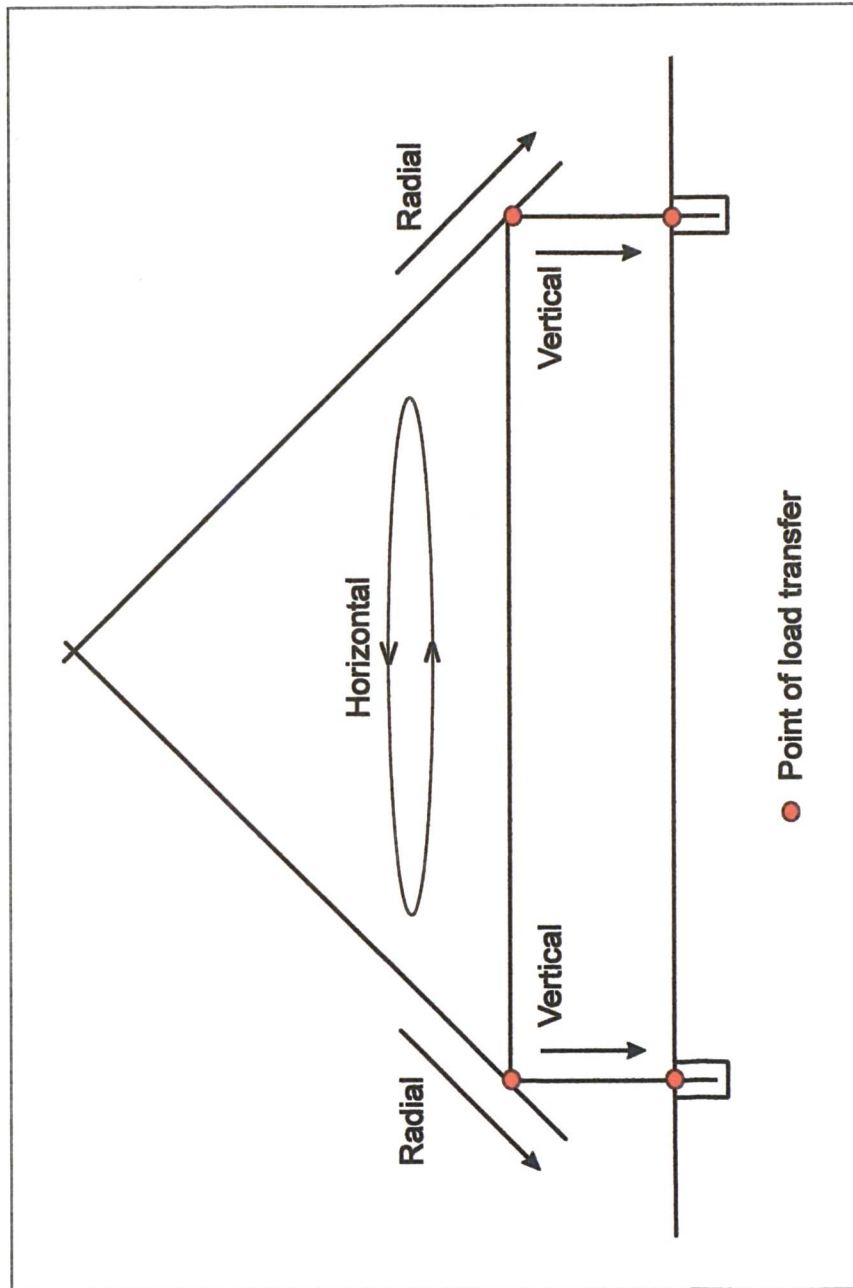


Fig 4.40 Distributing the load of the roof in a cone-and-cylinder structure

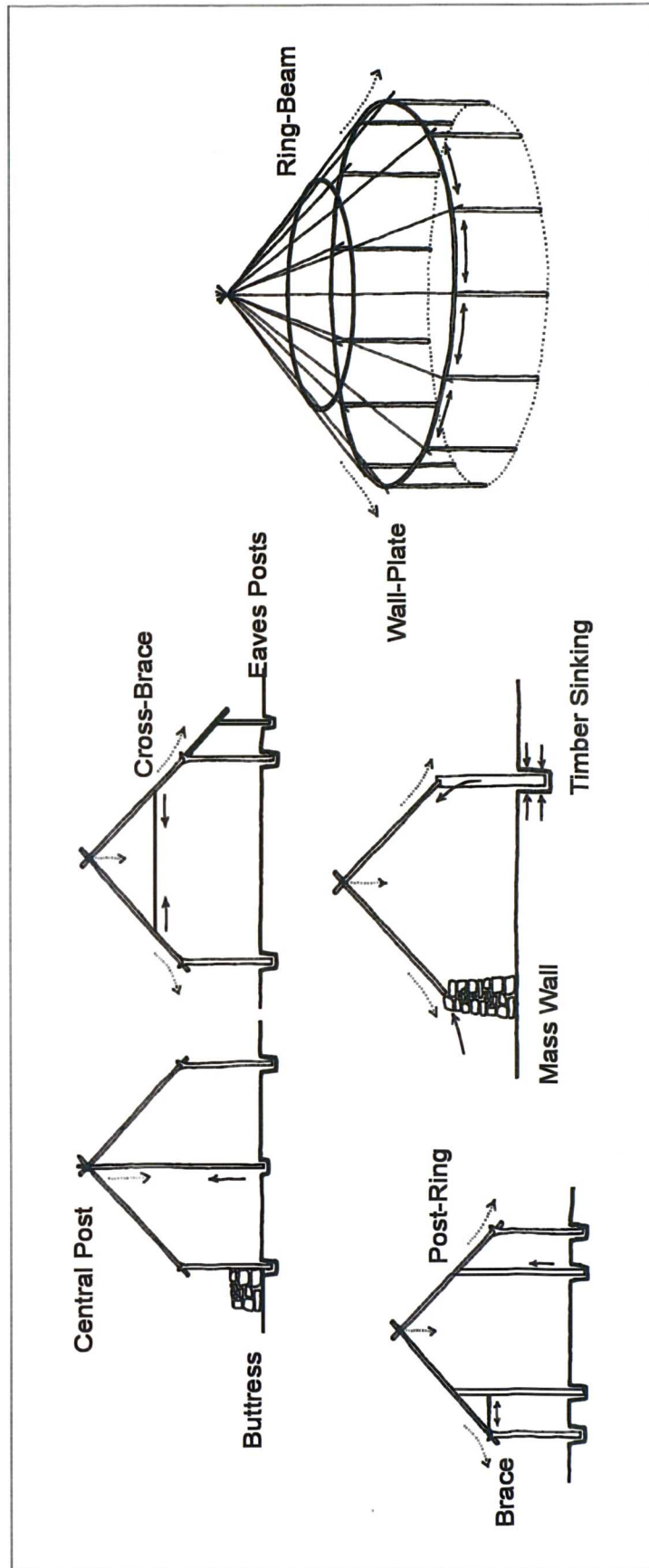


Fig 4.41 Structural systems of the cone-and-cylinder structure (adapted from Musson 1970a)

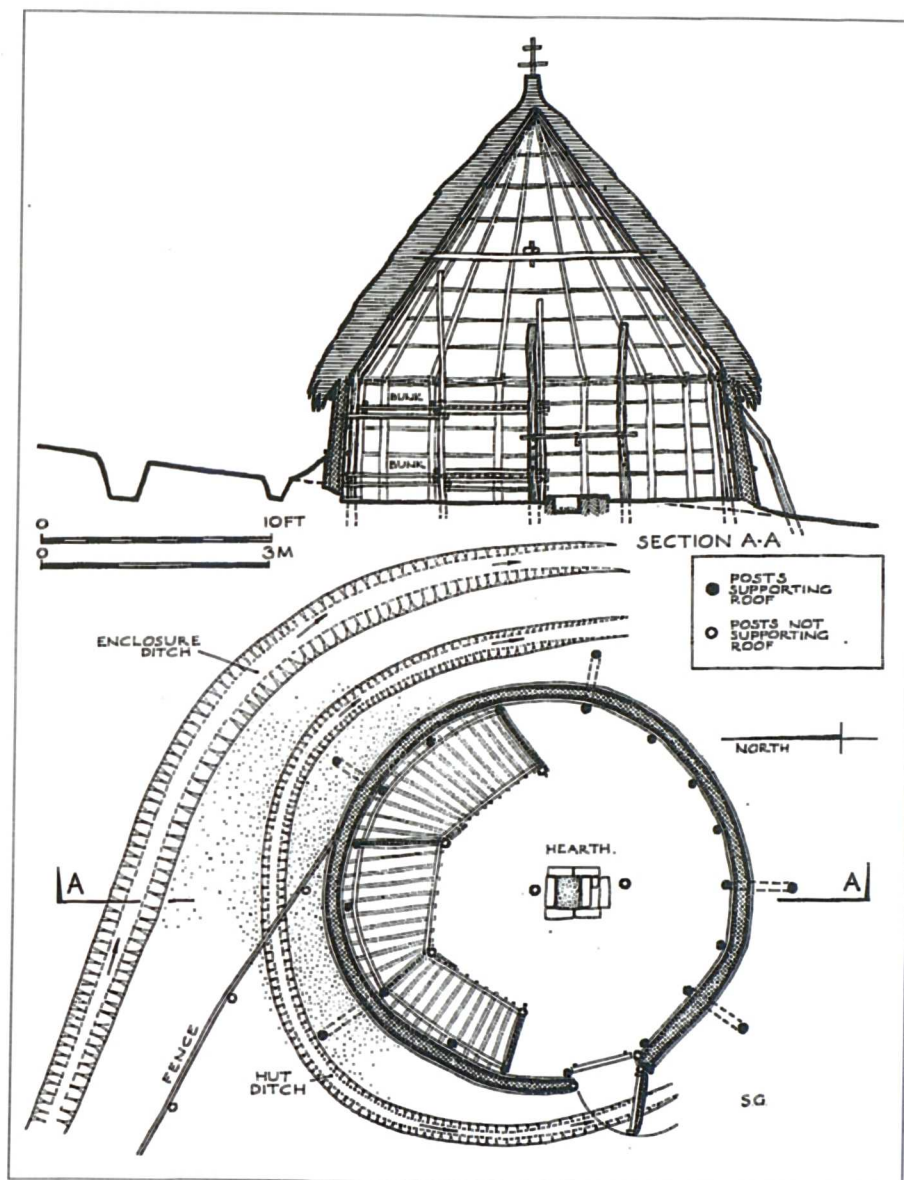


Fig 4.42 Close-Brooks & Gibson's (1966) 'round hut near Rome'

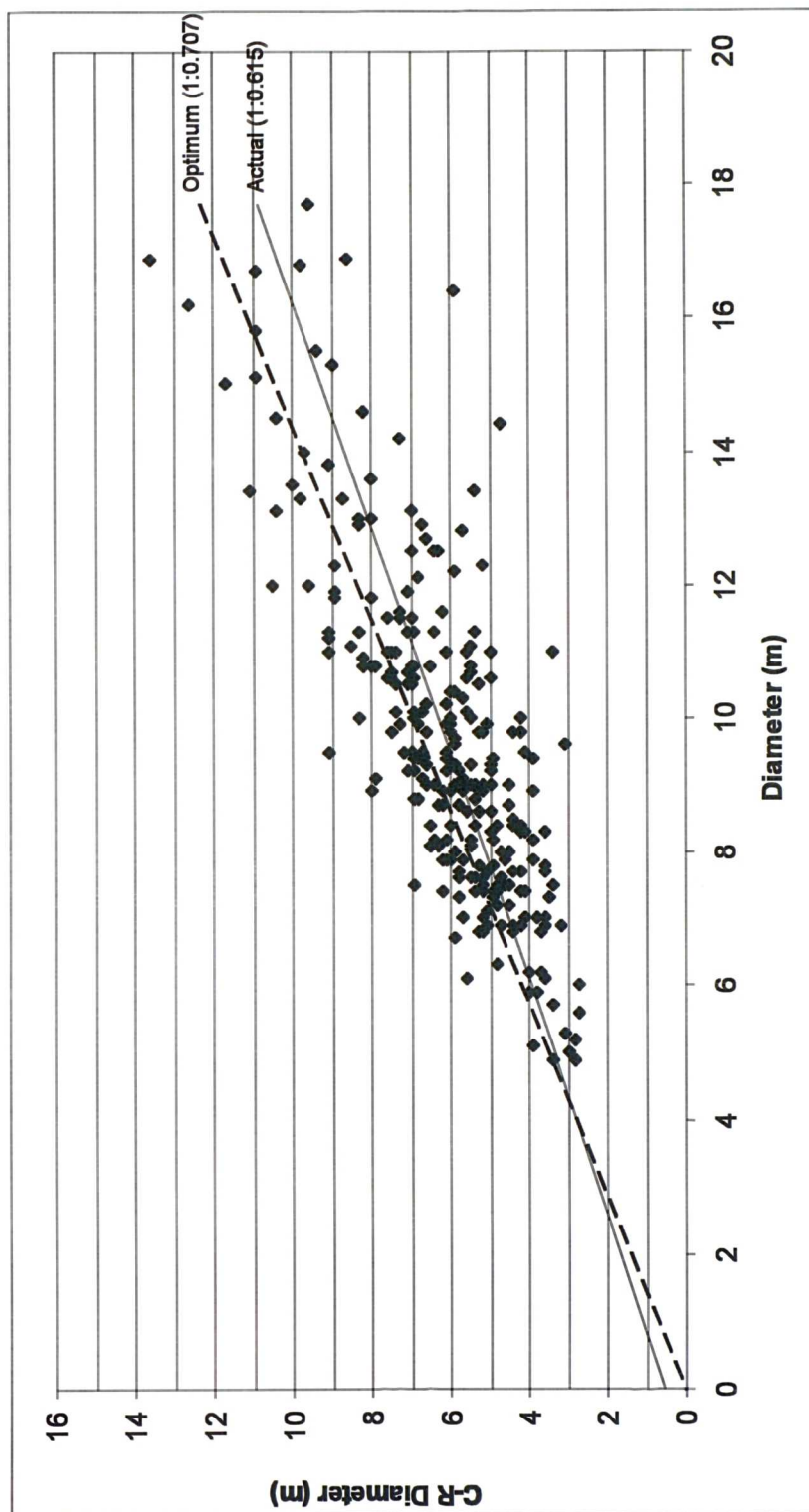


Fig 4.43 Hill's (1984) 'optimum ratio' tested against 270 double-ring structures from northern Britain

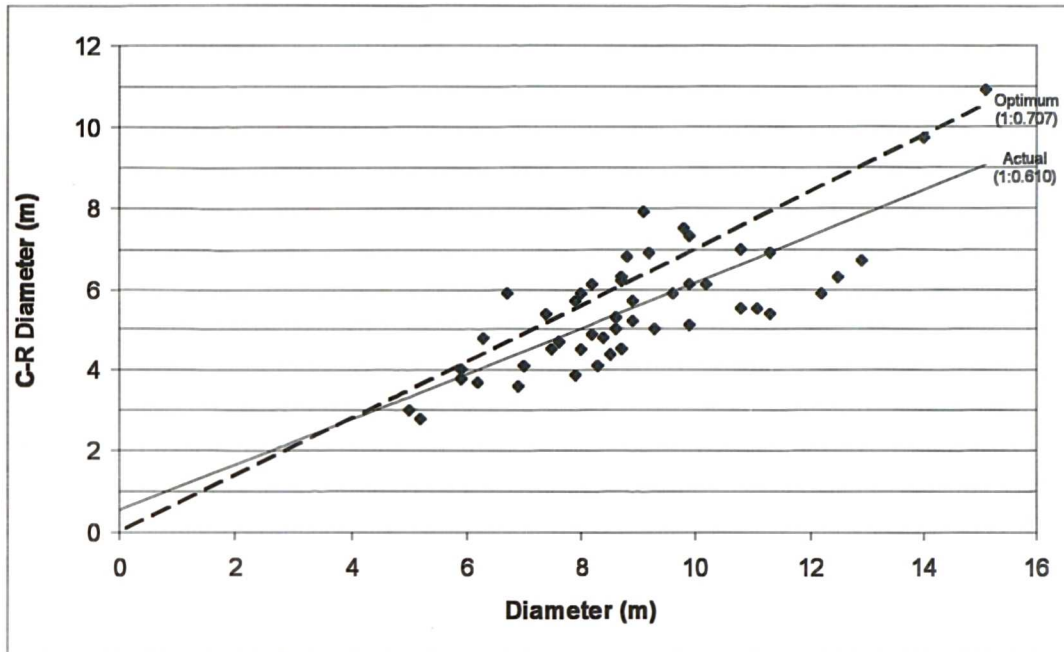


Fig 4.44 Placement of internal post-ring in bulk wall double-ring structures

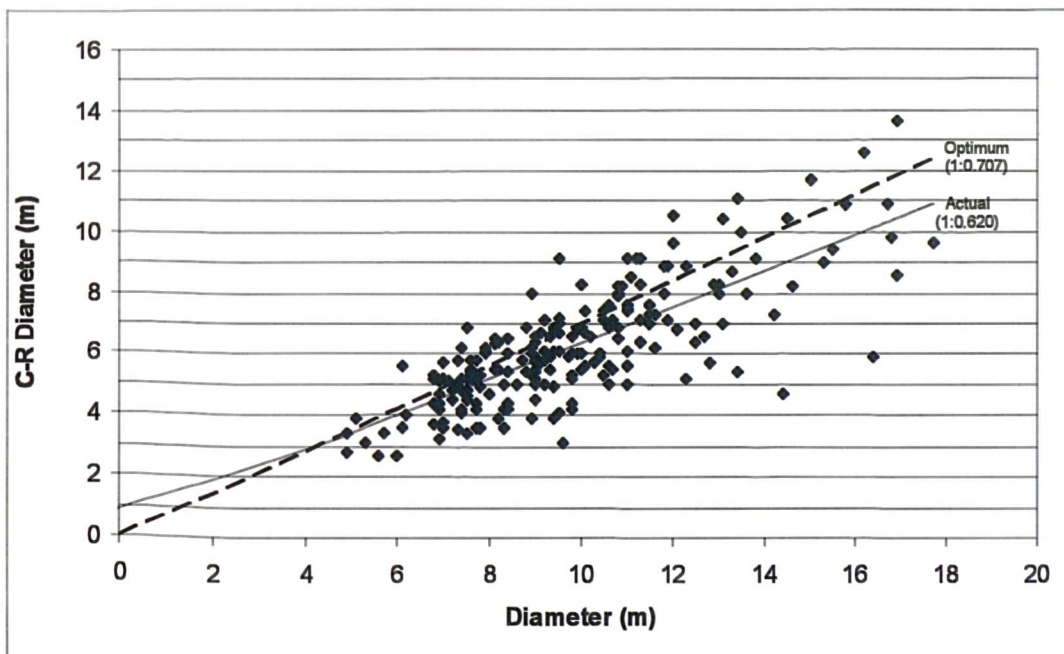


Fig 4.45 Placement of internal post-ring in timber-built double-ring structures

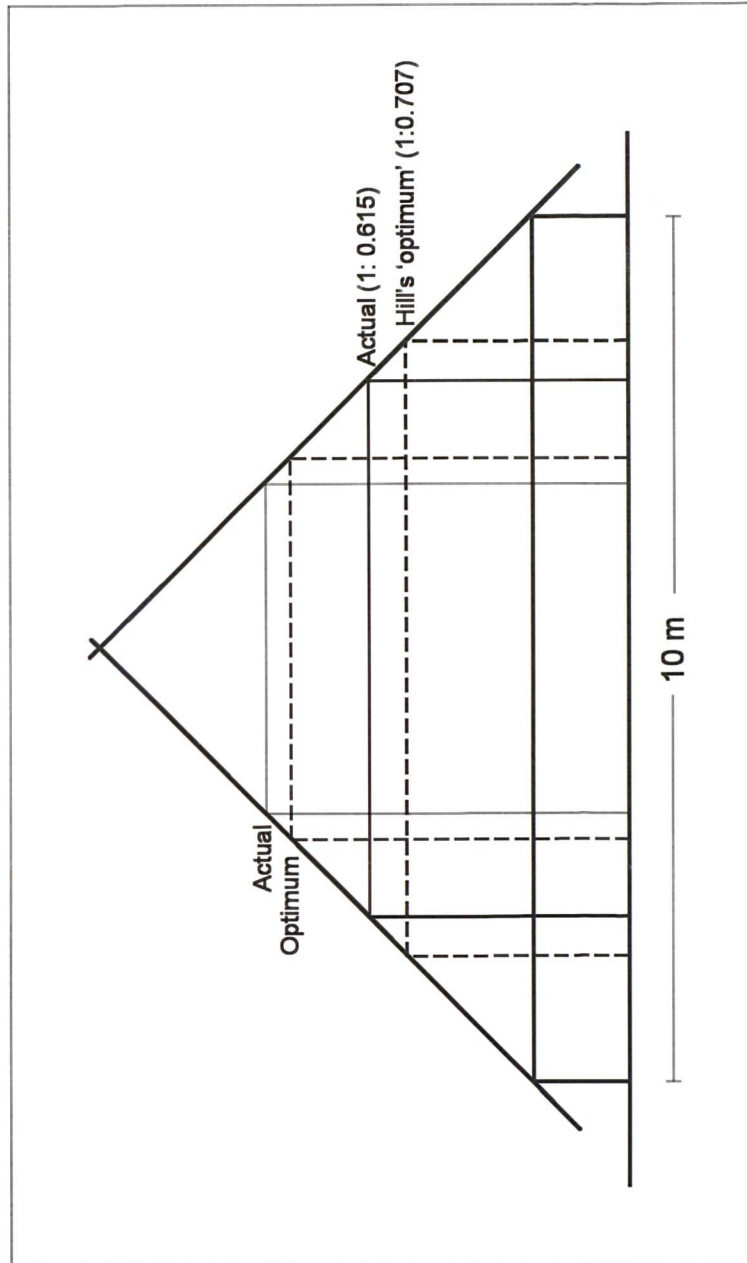


Fig 4.46 Structural optimums and observed placement of internal post-rings

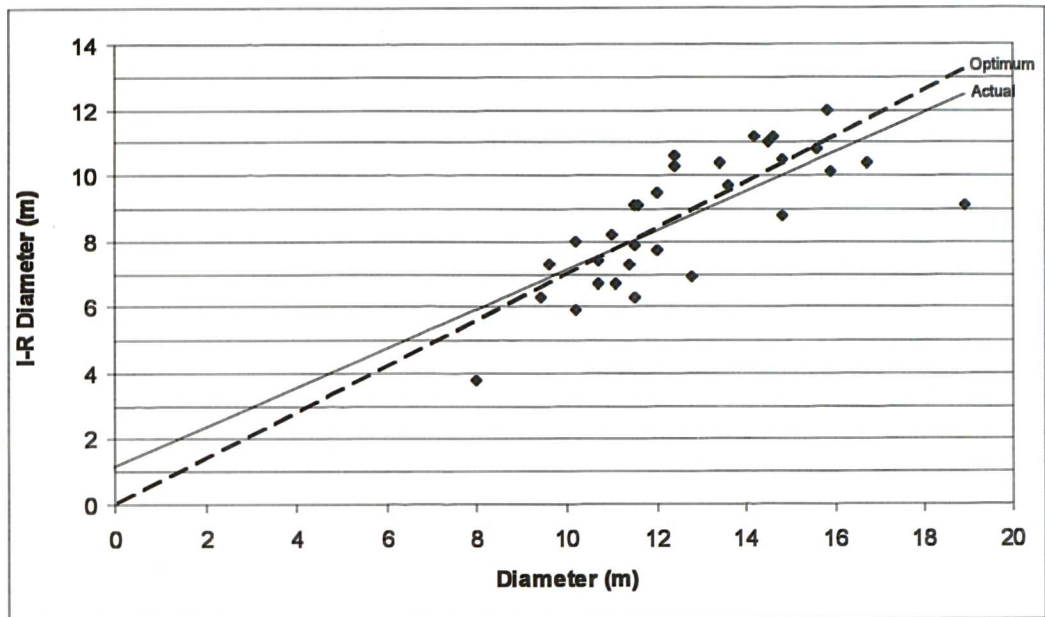


Fig 4.47 Positioning of the inner post-ring in triple-ring structures

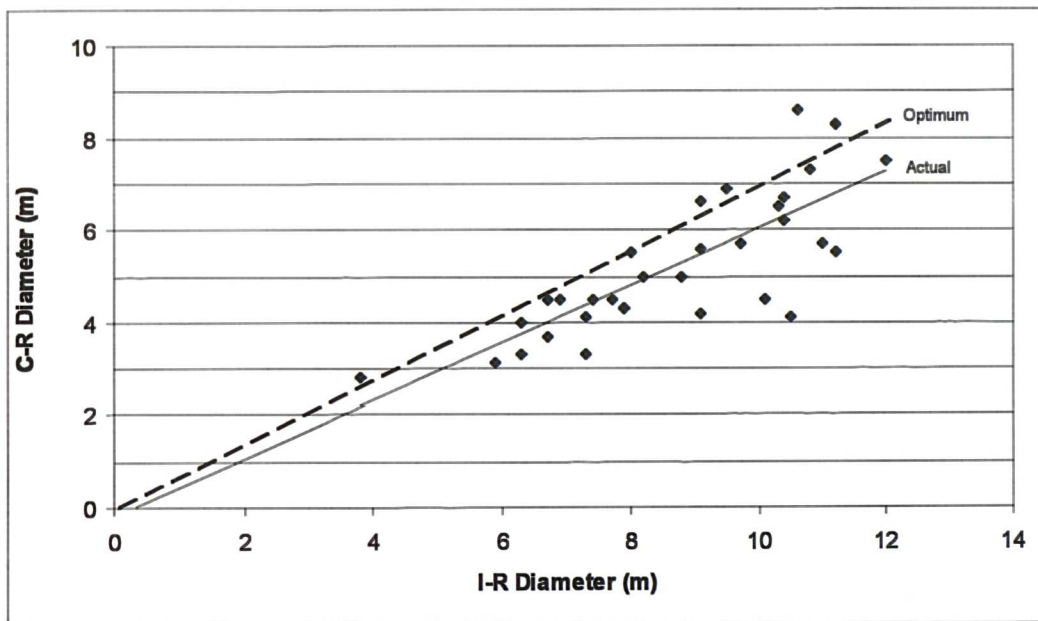
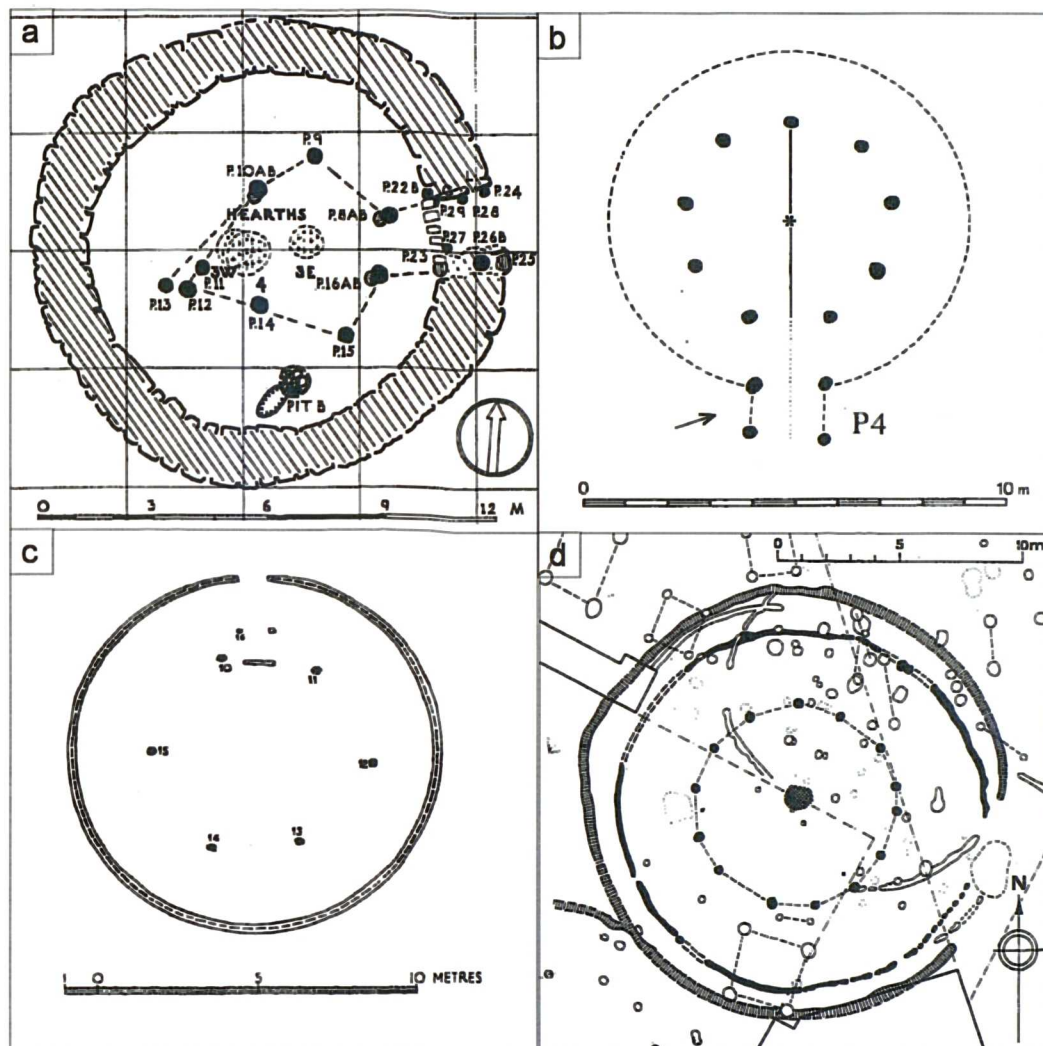


Fig 4.48 Positioning of the central post-ring in triple-ring structures



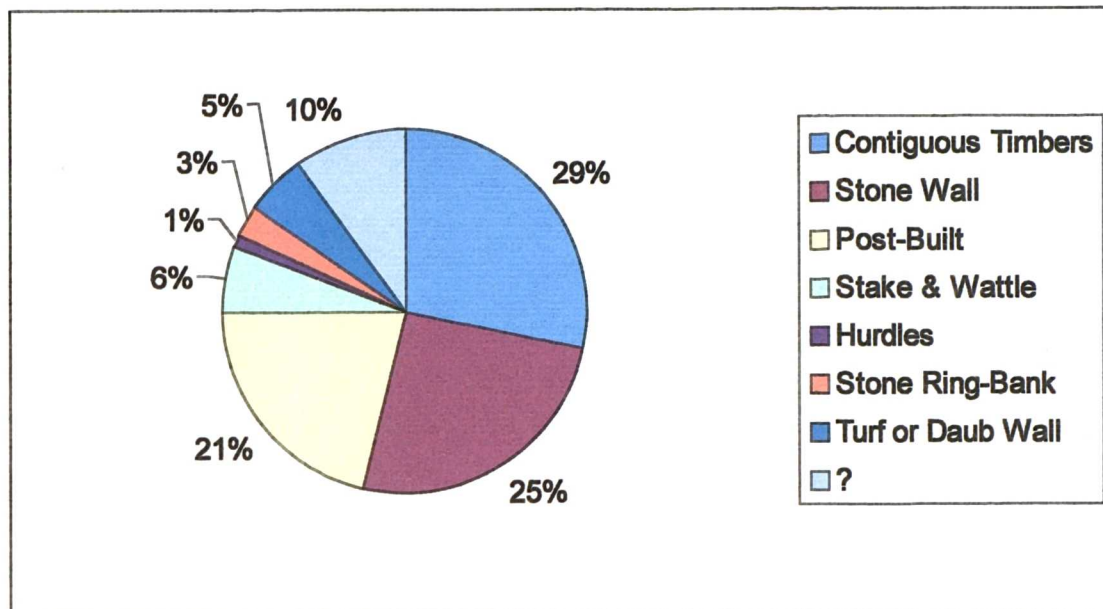


Fig 4.50 House wall type in north and central Britain

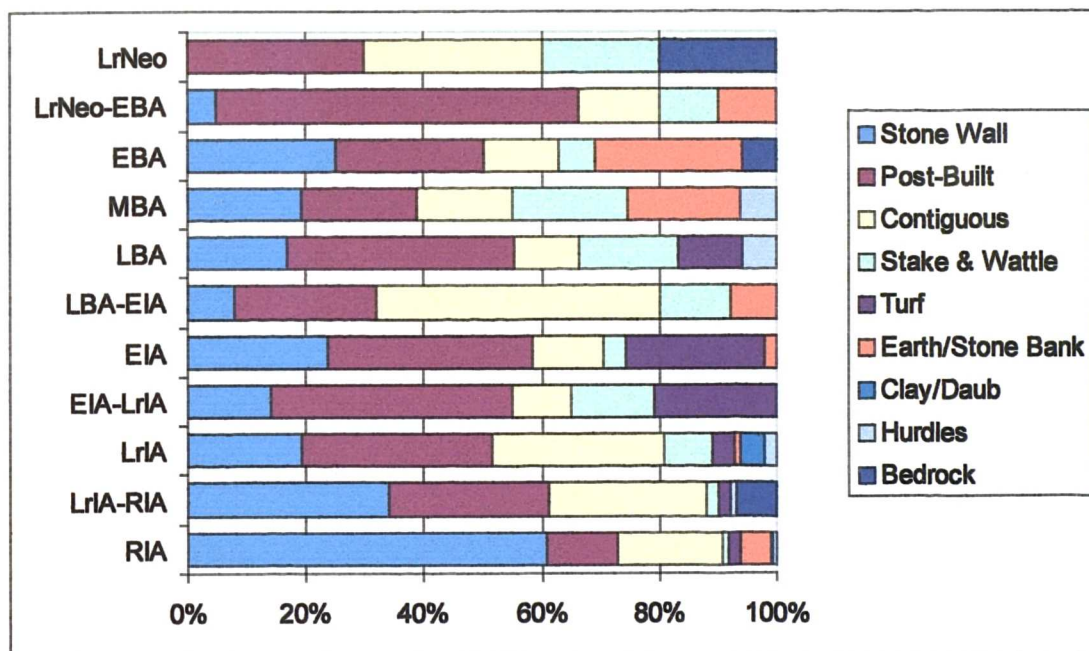


Fig 4.51 Chronological change in house wall type

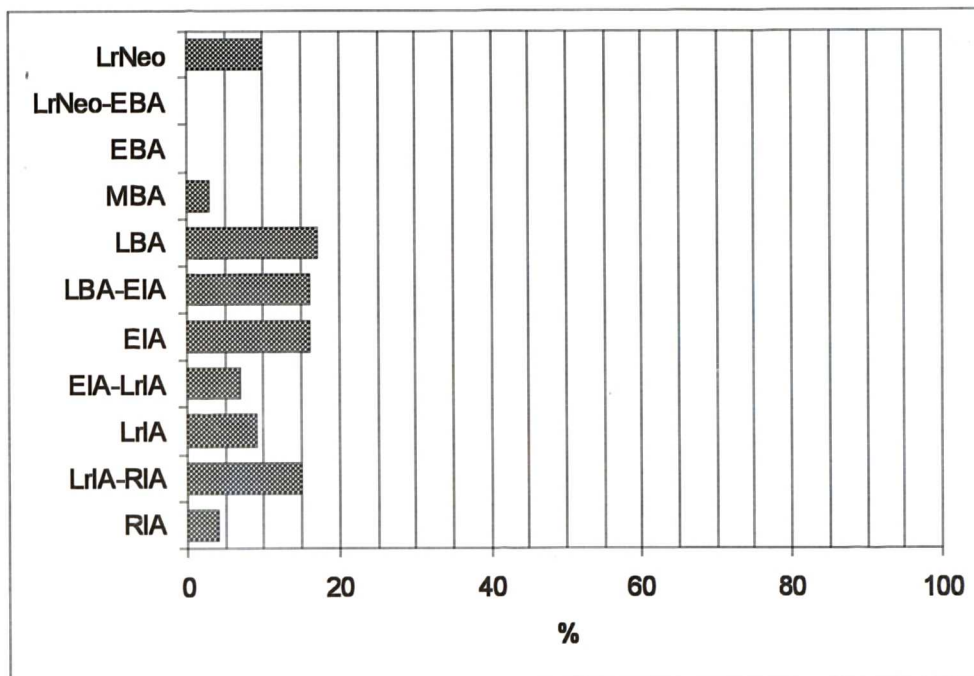


Fig 4.52 Chronological distribution of structures where evidence for wall is absent

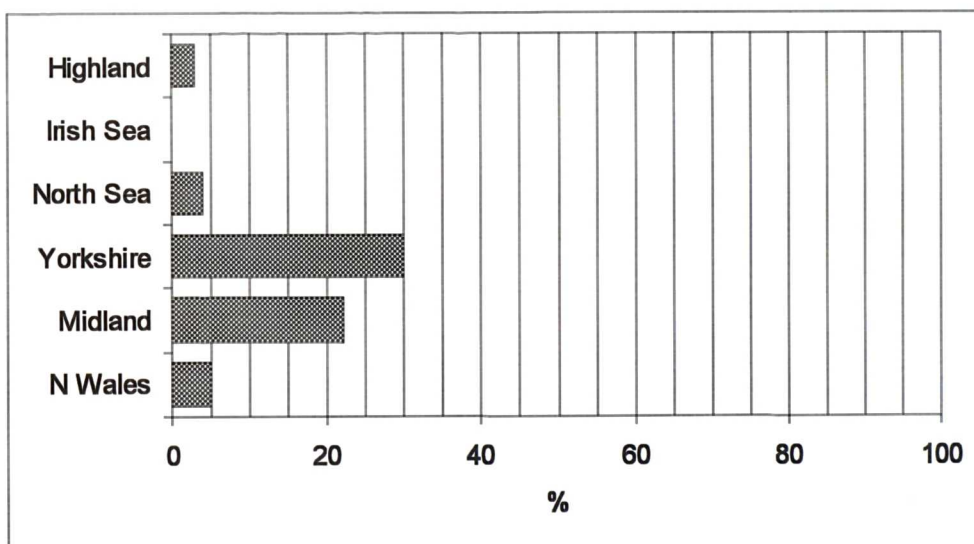


Fig 4.53 Regional distribution of structures where evidence for wall is absent

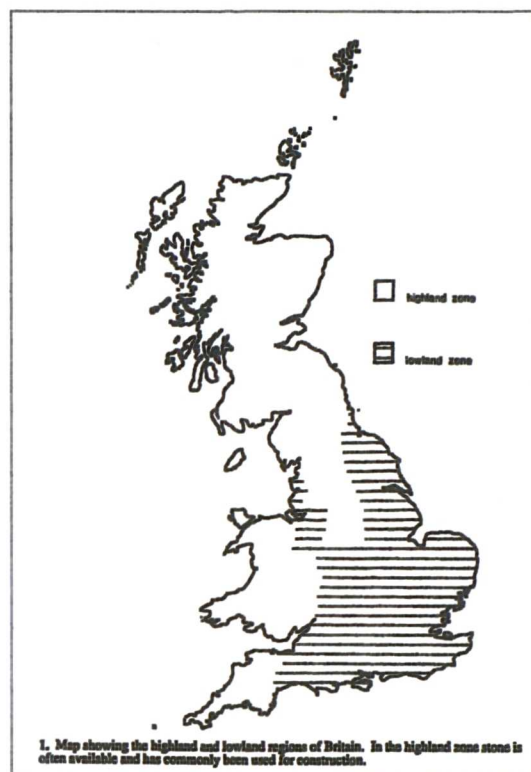


Fig 4.54 The highland-lowland division and construction materials (Reid 1993)

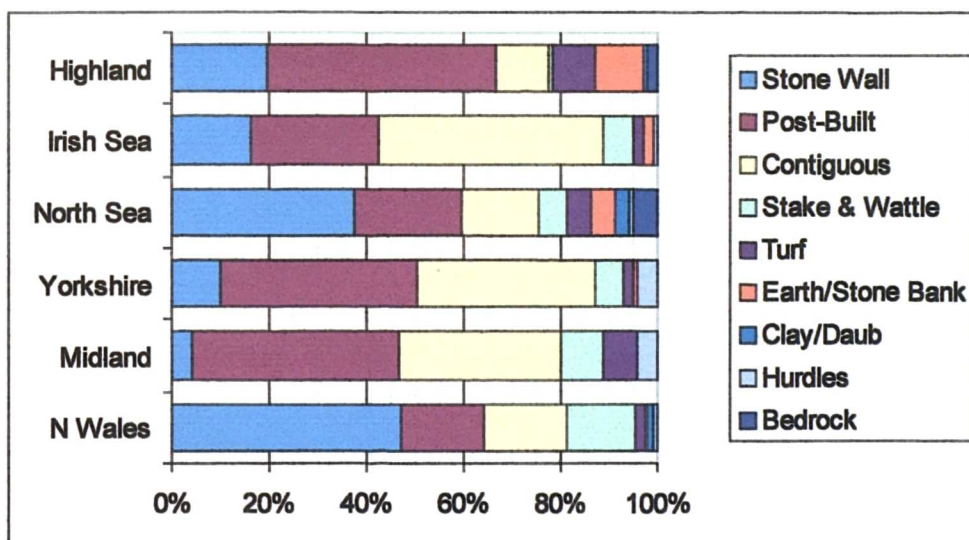


Fig 4.55 Regional variation in house wall type

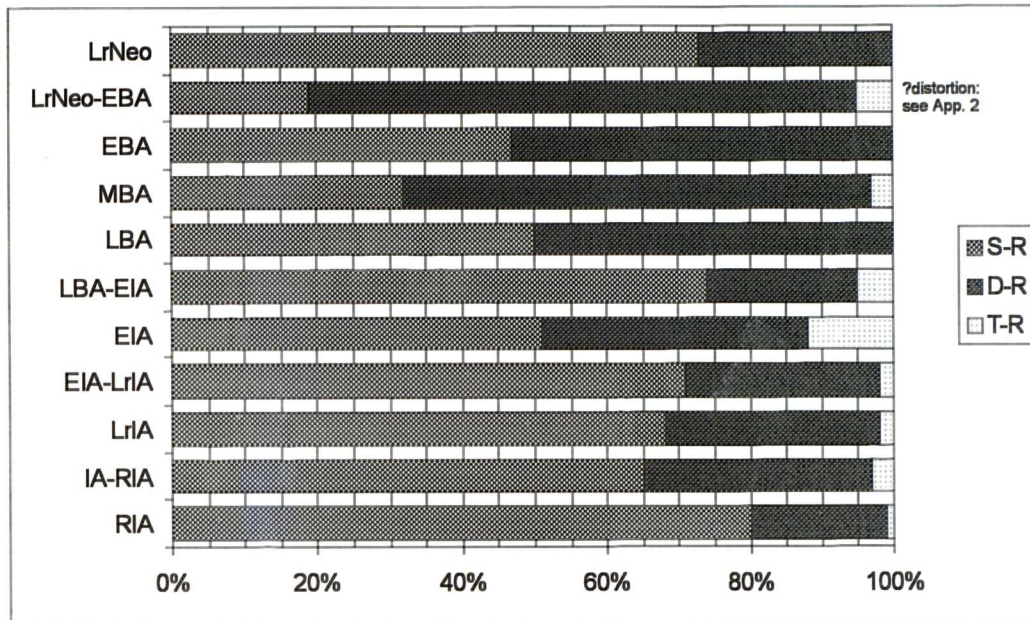


Fig 4.56 Chronological change in structural type

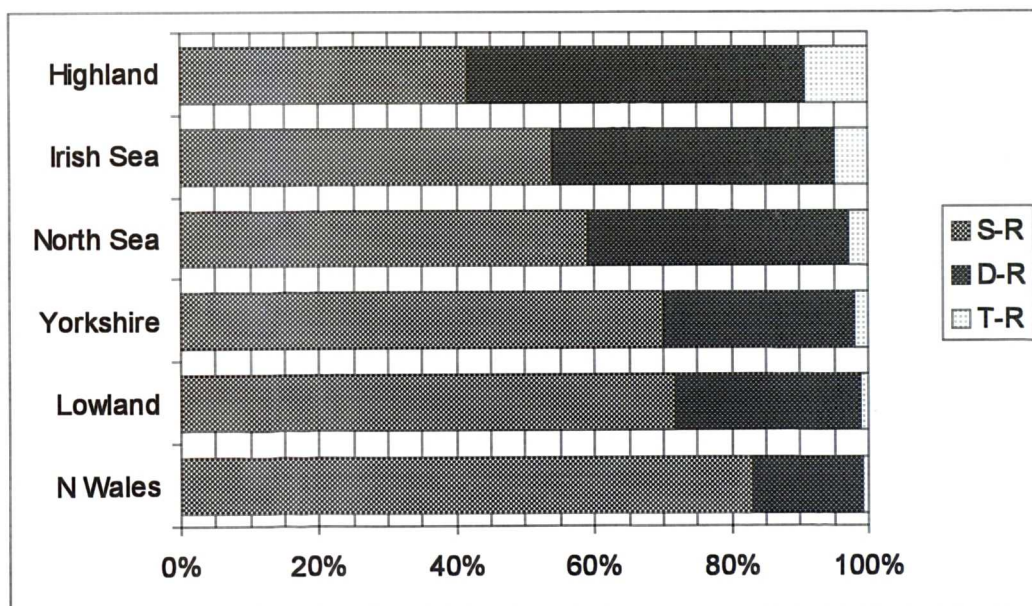


Fig 4.57 Regional variation in structural type

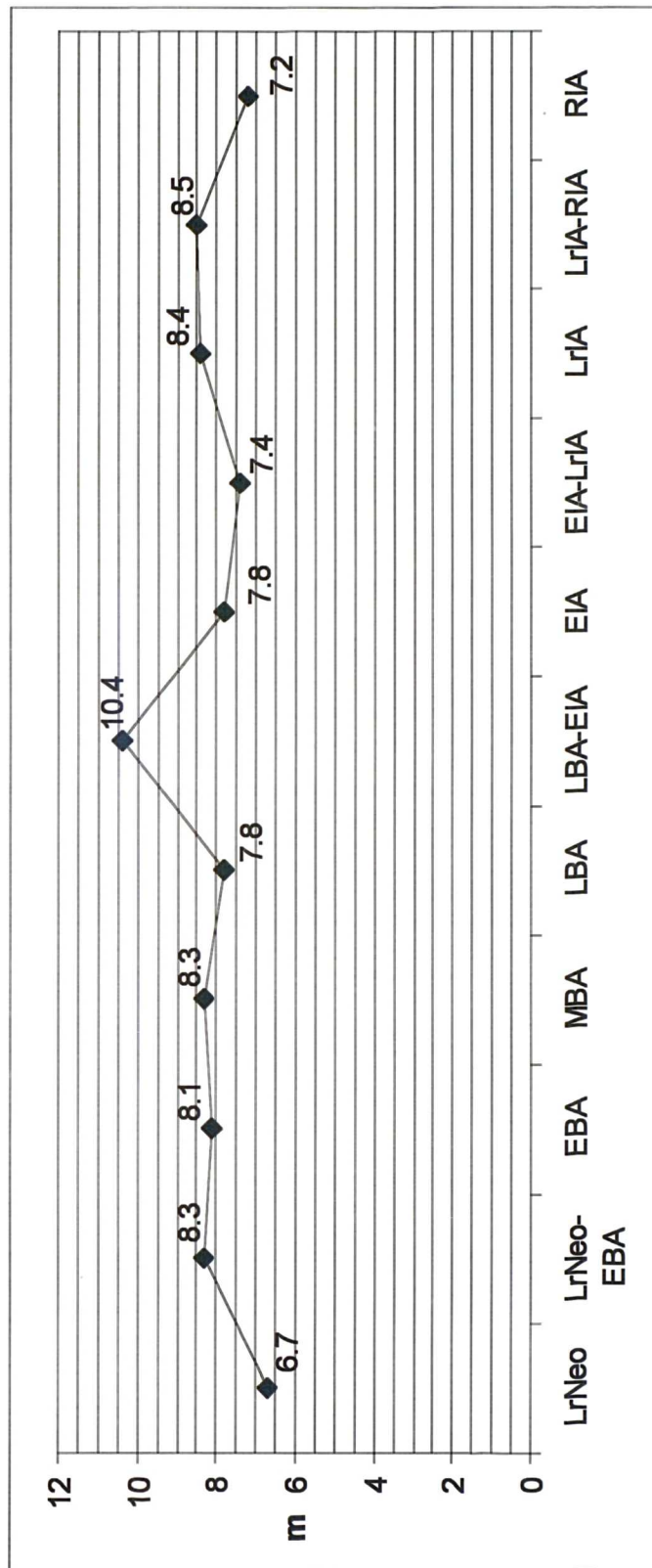


Fig 4.58 Chronological change in structure diameter in northern Britain

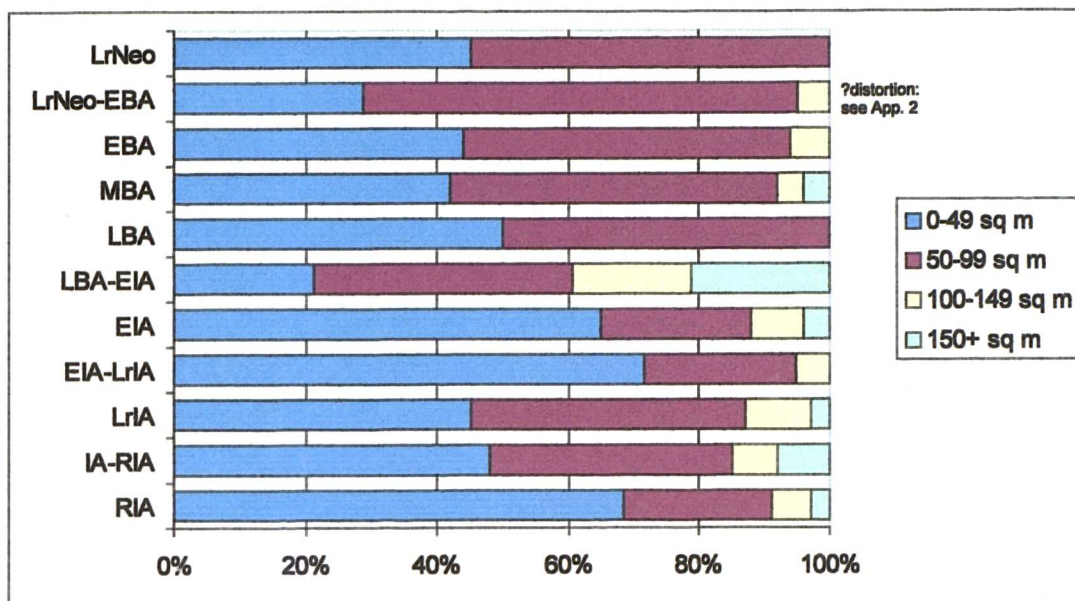


Fig 4.59 Chronological change in structure area

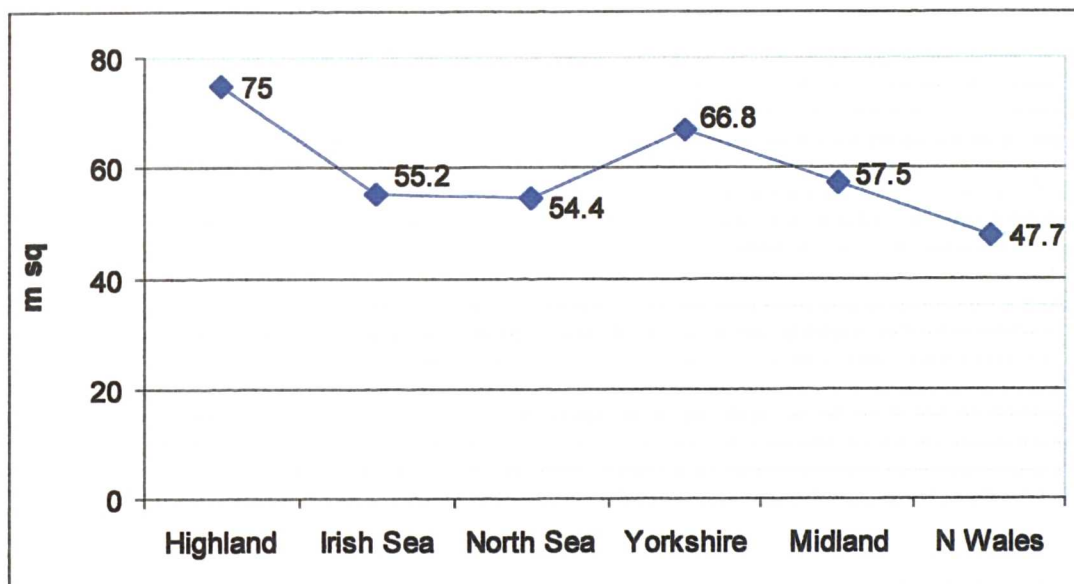


Fig 4.60 Regional variation in structure area

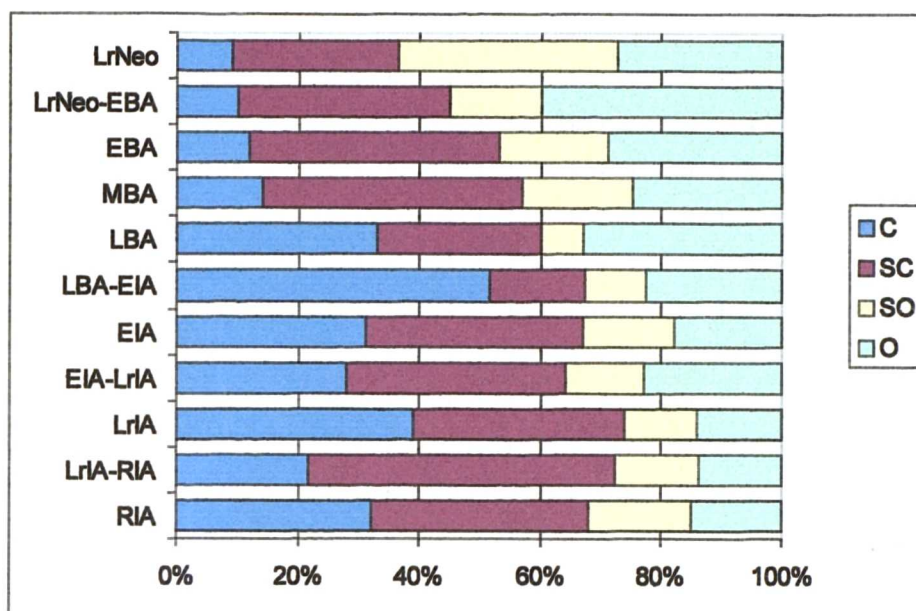


Fig 4.61 Chronological change in structure shape

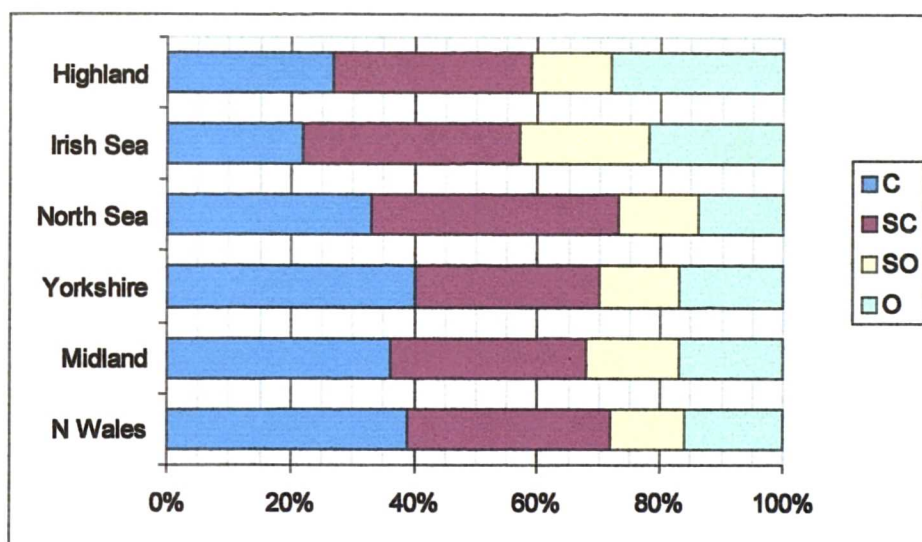


Fig 4.62 Regional variation in structure shape

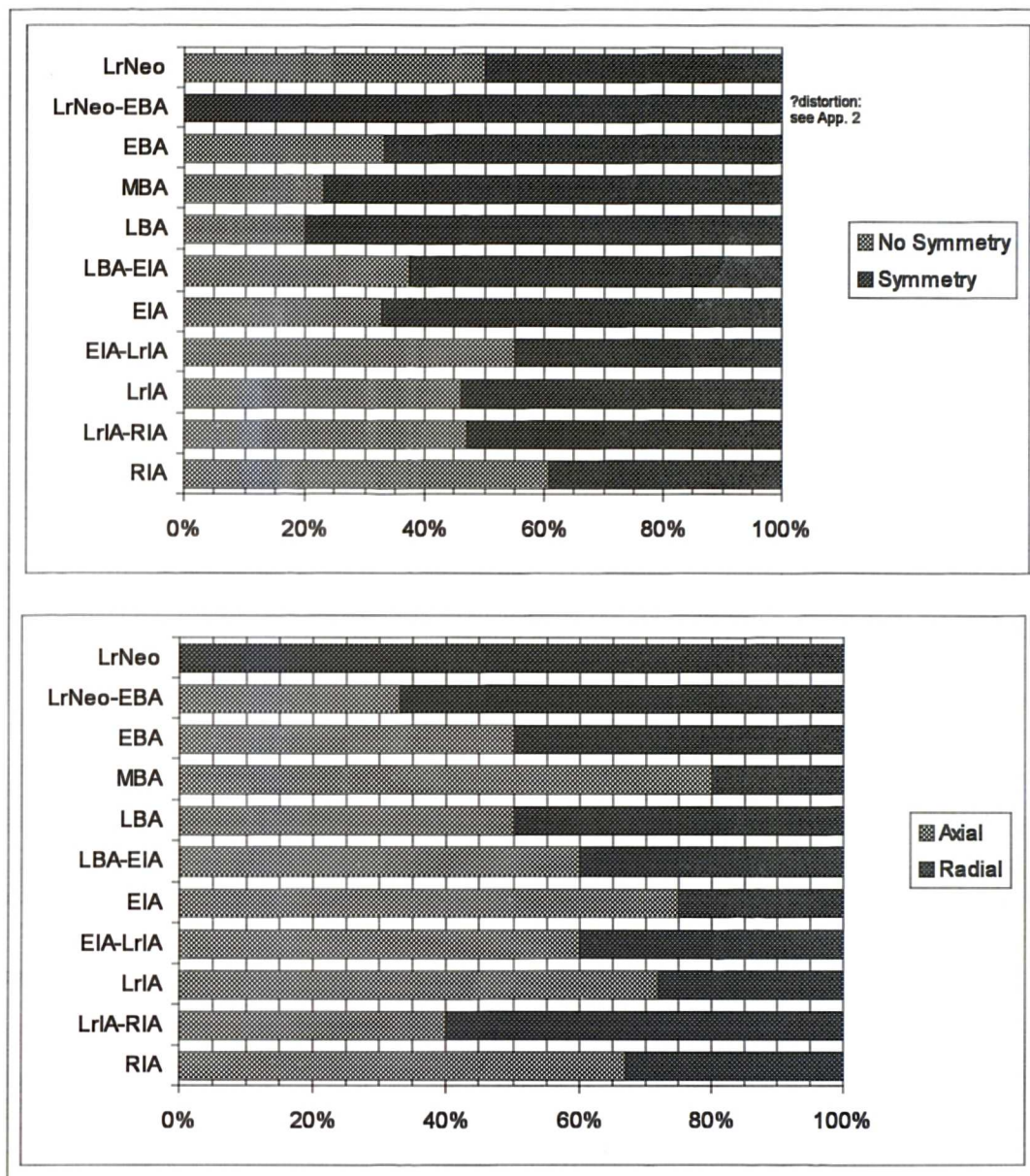


Fig 4.63 Chronological change in post-ring symmetry

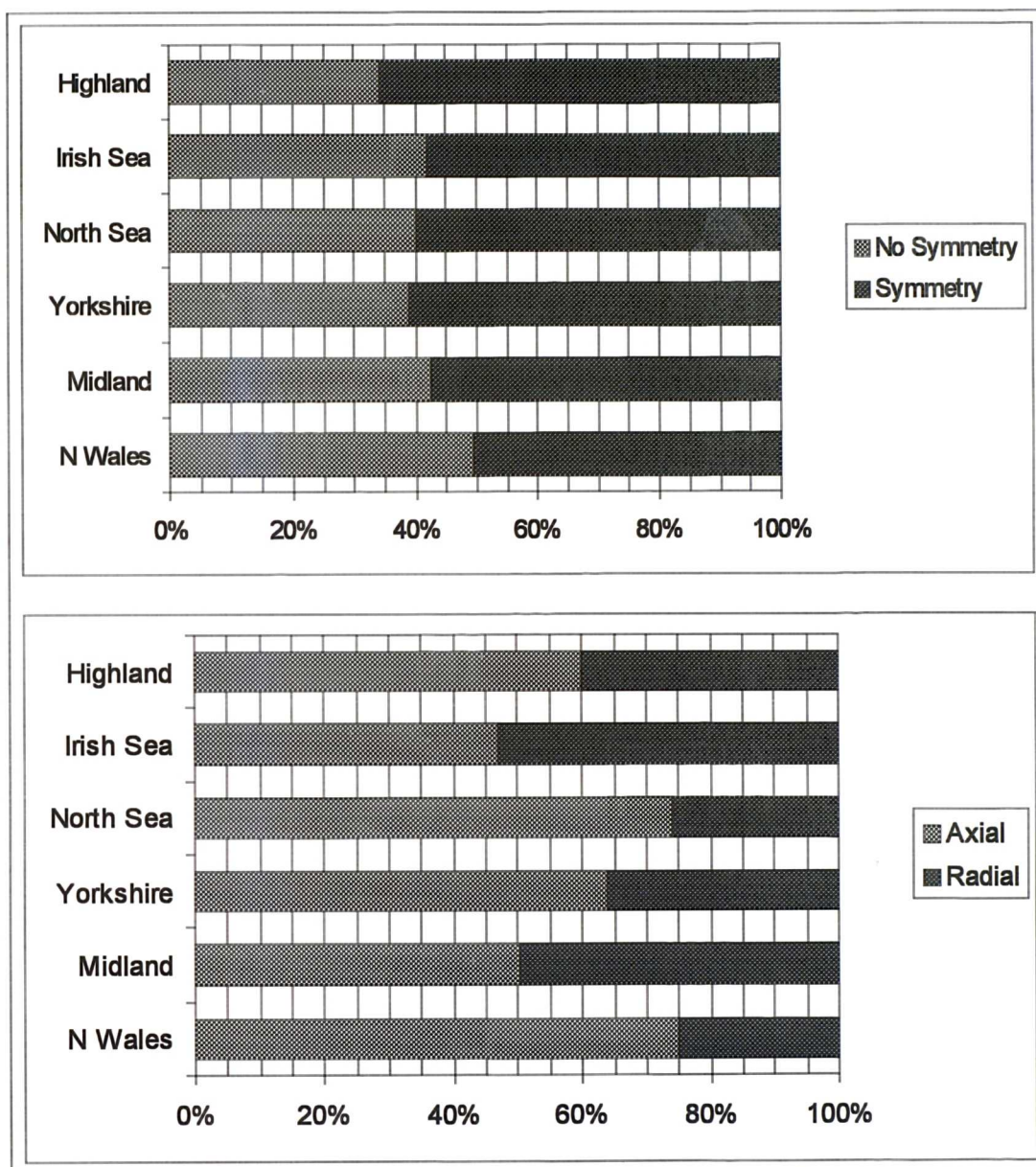


Fig 4.64 Regional variation in post-ring symmetry

Chapter 5 Construction

"There is a romanticism associated with drystone walls wherever they appear in the landscape. This feeling is not particularly shared by those who build them and less so by those who maintain them"

(Reynolds forthcoming, 217)

5.1 Introduction

This chapter will address the different processes involved in the construction of a circular structure with evidence from experimental archaeology and ethnography helping to inform the archaeological record. The chapter begins with a discussion of materials used and a consideration of those factors which influence the choice of site and house position. This moves onto evidence for the preparation of a site prior to construction. Following this is a discussion of the construction process itself. Evidence is then presented for the character of the various components of circular structures: the frame, walls, doorway, and roof. Regional and chronological trends in the construction of circular structures in northern and central Britain are then discussed.

5.2 Preparation

Prior to construction certain decisions have already been made, including which materials to use in construction and the choice of location. The site has been prepared and the structure design laid out on the ground. Materials have been acquired and prepared including: timber for the post-ring, rafters and ring-beams; wall timbers, or stone/turf; numerous rods, withes and bark; clay, soil, water, animal hair, vegetation, and dung for any daub; hay or heather for underlay and bundles of reeds or straw for the thatch. Construction of the *Pimperne House* – with a 12.8 m diameter and wattle wall – required material from a minimum of 200 trees and bushes (Reynolds 1983). Several weeks may be needed to gather and prepare the necessary materials for a new house (Denyer 1978, 92). Some materials may already have been stored in advance as certain tasks, like the harvesting of bark, are labour intensive and must be undertaken at specific times in the year (Aaron 1976, 21).

5.2.1 Materials

Tools

Early use was made of antler picks and stone axes in construction and at some sites these tool types continued much later. Stone axes were found in contexts associated with the roundhouse at LrNco Auchatogan (Argyll), MBA Lookout Plantation (Northumberland), LrIA Ballacagen B

(Isle of Man) and RIA Crock Cleugh East (Borders), whilst antler was utilised at LBA Dinorben (Conwy). Early use of the wooden mallet and wedges for felling and splitting timber might also be suggested. By the LrIA the toolkit increased following the new ubiquity of iron. Rather than wooden wedges, metal tools, such as the adze and chisel, eased the splitting of timber. Also available was the billhook - the most versatile and useful coppice tool which aids the splitting of small diameter wood (Tabor 1994; Charterhouse Richmond 2000). Reynolds used modern versions of Iron Age tools in his reconstructions of which the mallet and chisel were apparently the most useful (Reynolds 1979; 1995; Hodges 1989). Fig. 5.1 shows prehistoric forestry and construction tools. In addition, adzes were found at LrIA Ballanorris and RIA Riding Wood in Northumberland (Bersu 1977; Jobey 1960). Billhooks were also found at ?IA Parc Dinmor on Anglesey and RIA Cefn Graeanog in Gwynedd (Phillips 1932; Goodburn 1978); with chisels at Parc Dinmor and at RIA Braich y Dinas in Conwy (Hughes 1912; 1922). Toolmarks revealed that an axe or adze was used for digging features at the LrIA-RIA sites of Fairy Knowe (Stirling) and Rispain Camp in Galloway (Main 1998; Haggarty & Haggarty 1983). In addition, an iron reaping hook from the Dod (Smith & Taylor 2000) may have been used for harvesting reed.

This is by no means an exhaustive list of northern prehistoric forestry and construction tools as such tools are not often found in the immediate domestic sphere. This may be as a result of their storage off-site, perhaps at the woodland. Where tools are found they are mainly in large hilltop enclosures and we can perhaps suggest that these sites may have been associated with woodland management. Iron tools are particularly well-represented in north Wales, linked perhaps to the major iron-working sites in the region, at Bryn y Castell and Crawcwellt West in Gwynedd (Crew 1985; 1998). Perhaps a bias in survival is also represented. A lack of tools might equally be a result of the practice of recycling metal in some areas. Nevertheless, hones or whetstones are found much more frequently in the domestic sphere and leave us with an idea of how common edged tools were, even when none are found through excavation. In excess of 67 hones have been found in 45 structures from 33 sites. The majority (60%) of these date to the LrIA-RIA period. Certain types of sites are represented: one in three is a large upland enclosure: Burnswark Hill, Eildon Hill North, Hownam Rings, Traprain Law, Yeavinger Bell in the North Sea Region; Mam Tor in Derbyshire; and Braich y Dinas, Conway Mountain, Old Oswestry, Ty Mawr in the North Wales Region. Well-represented too are the RIA rectilinear enclosures of north-east England. Unenclosed hut-circles of all periods are also represented including the ErBA sites of Bracken Rigg (Durham) and Green Knowe (Borders).

Timber

Timber is large diameter material provided by the trunk of a tree and is used whole for such elements as the principal rafters, post-ring and entrance posts. Splitting timber – either radially or tangentially – provides material for contiguous timber walls (fig. 5.2). In an 8 m structure – the prehistoric average – internal posts are 2.5 m long and such lengths of straight timber are easily found in dense, well-managed woodland, as mature trees easily provide 6 m of usable trunk (Reynolds 1983; Haggarty & Haggarty 1983). In the average structure with a 45° roof pitch, the principal rafters are 7 m long, rising to 7.9 at 50°. At 45°, a 15 m structure demands 12 m principal rafters and whilst such lengths are possible in oak – as proved by Reynolds' *LDCD House* – they were probably frequently salvaged as indeed they were at *Pimperne* for reuse in the *LDCD House*. It is traditionally assumed that timber is a valley resource although Piggott (1947-48) argued for the existence of open woodland at higher altitudes on the hills of the Borders. The pollen diagrams from Buckbean Pond on top of the Breiddin – at more than 300 m OD – reveal woodland cover – hazel, birch, oak and alder – throughout prehistory (Smith *et al.* 1991). The same is true in pollen diagrams from slightly higher altitudes – approaching 350 m OD – in Upper Teesdale (Donaldson 1980). At similar altitudes peat bogs above Dalrulzion (Perthshire) revealed evidence for prehistoric hazel growth and tree trunks were found in the peat of Alnham moors in Northumberland (Thorneycroft 1932-33; Tate 1861). Such high tree growth is easily supported by recent pollen analyses (cf. Tipping 1994, 16).

At c. 3000 bc, most of the woodland in northern Britain was made up of alder, hazel and oak; (Smith *et al.* 1981, fig 4.1). In northern Scotland, however, birch, pine, hazel, and alder were the most common species (*ibid*). Birch has light abundant seed, grows rapidly, and tolerates poor soils (Tabor 1994, 30). Fig. 5.3 shows wood identifications from timber in structural features¹¹. Oak is the most popular wood type in prehistoric construction representing one in three identifications. A strong wood with durable heartwood, oak was the main structural timber in use in Britain until c. 1740 AD when it was replaced by more cost-effective softwoods (Desch & Dinwoodie 1981; Rideout 2000, 135). Hazel, birch, and alder are the next most popular wood types, followed by ash. The latter three are all tough and easy to work and hazel – whilst poor for timber – is fast-growing and easy to coppice. Pine and willow are rare. There is a slight preference for use of oak and birch as internal posts and these were presumably selected for their strength properties. Of the eight structures in Highland Scotland with central post wood identifications, six include birch, five alder. In the north these wood types were presumably selected for their medium strength qualities in the absence of oak. Birch, however, is perishable, susceptible to insect attack and has a problem with shrinkage (Desch & Dinwoodie 1981, 125;

¹¹ Whilst possible that in some instances the wood is incorporated later – perhaps following salvage activity – it is assumed that the majority of identifications represent the wood of the upright.

Tabor 1994, 31). This might explain why as many as one in two structures in Highland Scotland are made from stone or turf as opposed to the one in three norm (prior to the advent of the LrIA).

Reynolds used green, unseasoned timber and wood at the *Pimperne House* (Reynolds 1993, 96). The high moisture content of green timber means that it is very susceptible to decay, particularly if cut in summer. If unseasoned, oak also has a marked tendency to split and warp (Hodges 1989). Seasoning allows the timber to dry out, thus minimising distortion. Seasoned wood is also stronger, yet lighter and easier to transport (Rideout 2000 119-120). Air drying is the oldest and most practical technique and, if stacked carefully to allow even air flow, moisture content may fall to 17-20% thus preventing decay (Zabel & Morrell 1992, 121). Seasoned wood is the choice habitat of the furniture beetle and its identification at LrIA Fisherwick 3 (Staffordshire) may point to the seasoning of wood in later prehistory (Smith 1979, 30). It is interesting that at Fisherwick 3 the circular structure also had squared doorframe posts. Oak dries very slowly, has a tendency to split and, once seasoned, is quite difficult to work (Desch & Dinwoodie 1981, 206). The work of Darrah (1982) suggests that one way to overcome these problems is to split timber when it is green and *then* season it: this has the effect of limiting distortion - as there are fewer stresses - and obviates the need for splitting once seasoned. The barking of timber also results in increased stresses and it is suggested that timber generally retained its bark, even so, end-splitting may occur because of fast evaporation in a localised area but this can be avoided by simply covering the ends of the posts (Rideout 2000, 120-121).

According to Tacitus, the British used wood in its natural form - as opposed to the Roman practice of squaring-off timbers (Reynolds 1979, 30; fig. 5.2). Oak sapwood is particularly susceptible to insect attack and the squaring of timber rids the post of this problem (Desch & Dinwoodie 1981, 206). Despite the words of Tacitus, the technique was identified at eight pre-Roman sites in north and central Britain. Six of these sites produced evidence for the squaring of central-ring posts (table 5.1). Squaring of outer wall posts was also observed at MBA Glanfeinon in Powys (Britnell *et al.* 1997); and LrIA Castell Odo CS A in Gwynedd (Alcock 1960). Of those sites with secure evidence for the squaring of substantial timber posts - and where dating evidence was refined - 80% of structures are of LrIA date, 51% above the number expected according to the proportion of LrIA sites. A wall-slot without timber impressions can be taken as evidence for the use of contiguous wall posts. These probably take the form of whole, fast-grown trunks or large split timbers in most cases, but in ten structures there was definitive evidence for the use of planks. Planking also has the positive effect of removing sapwood but the reduced width of the timber shortens its potential lifespan anyway (see 7.3.2). In those sites with evidence for planking, 63% are of LrIA date - 34% above the number expected.

Site	CS	County	Period	Reference
Greenbogs	A & B	Aberdeenshire	LrNeo-EBA	Greig 1996
Braich y Cornel	II	Gwynedd	IA	Gresham 1972
Ballacagen Lough A	-	Isle of Man	LrIA	Bersu 1977
Ballacagen Lough B	-	Isle of Man	LrIA	Bersu 1977
Lairg	7	Highland	LrIA	McCullagh & Tipping 1998
Sharpstones Hill A	F1	Shropshire	LrIA	Barker <i>et al.</i> 1991

Table 5.1 Evidence for the squaring-off of central-ring posts

Wood

Wood is smaller diameter material than timber and can be provided naturally by the upper branches of a tree, however straight material is hard to come by in this way. There is substantial evidence to suggest the prehistoric practice of coppicing (fig. 5.2d). When a tree is felled, the remaining stump (stool) stays alive. The extensive root system of a mature tree means that any new shoots are fast-growing (Tabor 1994, 14). If managed, this natural phenomenon has the potential to create a renewable, controllable, contained resource of withes, rods, poles, and eventually timber. The practice is known as 'coppicing' and it has its origins in the 3rd millennium BC (Coles *et al.* 1978). Pollarding is a similar practice except that the trunk is cut at 2.4 m or more above the ground (Tabor 1994, 15). Pollarding may have been preferred in unfenced woodland, as both wild and domesticated animals graze on the young shoots of coppiced stools. Pollarding, however, tends to create less-straight material. All of the major prehistoric tree species coppice. Of these, hazel produces the finest wood, at a good rate: its shoots grow 1.5 m after just one summer (*ibid*, 15; 22). Hazel produces withes at 6-12 years; birch withes are available at 5-10 years; oak and ash produce withes at 7-12 years (*ibid*, 23-31). Coppice can also produce larger diameter material. If coppiced oak is allowed to continue uninterrupted, the shoots thin out naturally to four or five poles (*ibid*, 26-27). Oak has a diameter of 2.5 cm within its first 7-8 months and the rods increase by the same amount every subsequent year (Desch & Dinwoodie 1981). At this rate the average prehistoric post width of c. 0.30 m would be achieved in just twelve years.

For the 12.8 m *Pimperne House*, wood was taken from 10-20 year-old trees in a managed woodland and the uprights for the outer stake-ring alone required wood from 57 trees (Reynolds 1993, 96). Rods were gathered from 50 hazel stools averaging seven rods per stool: a total weight in excess of four tonnes (*ibid*, 97). The 1998 *Castell Henllys House* – at 13 m – used material from c. 90 coppiced hazel bushes – 125 bundles of 3 m long rods – for the walls and purlins: one bundle for each metre of wall (Bennett 2001; forthcoming). However these estimates are based on the use of wattle walling when in fact the dominant wall type in prehistory was of contiguous timbers (see below). The circumference of the average prehistoric circular structure is 24.8 m. If average timber diameter is c. 0.30 m then c. 83 wall posts would

be required for the wall. If one tree produced just five wall posts then seventeen trees would be required for the average contiguous timber wall. If Bennett (2001) required timber from 34 trees for the rafters, then the average structure – at 7.9 m - might require twenty. Adding this figure to that estimated for the walls, it is estimated that the average structure would require timber from c. 37 trees. If spaced at 3 m – the average for mixed coppice (Tabor 1994, App. 3) - this could be achieved in an area 15 m x 15 m (225 m²), or 0.023 ha. It is likely that prehistoric practice incorporated wood coppice alongside timber coppice (*ibid*, 16) and this figure might be increased – perhaps to 0.03 ha - to account for the additional resources provided by small wood coppice such as tying materials, purlins, cross-rods and spars for the thatch¹² (see below).

Bulk Materials

Each of the reconstructed *Conderton Houses* needed between 50-90 tonnes of stone (Reynolds 1983; forthcoming). Stone exists as outcrop, as natural boulders in the soil and in river and stream beds. Its availability is geology-dependent – although it may exist as erratics - and is especially plentiful in upland landscapes. Little evidence exists for prehistoric quarrying of outcrop and waterworn stones are too smooth for use in walling (Brooks 1986). It is the angularity of the stones in drystone walling – used without the need for breaking - which makes them bind together under pressure (*ibid*). Most utilisation then is of naturally occurring boulders and smaller stones from the soil. At Conderton, the limestone used in the wall could be obtained by digging into the hillside (Reynolds 1983). Material would become available during field clearance activities. In addition, when a platform site is created the small material quarried from uphill is used to build up the downhill side but the larger material is utilised in the wall. Until the LrIA-RIA, use of stone is most frequent in Highland Scotland where it is in abundant supply, particularly in the north and west. Turf is also in plentiful supply, and is of particularly good quality in upland landscapes. Turf becomes available during preparation of the house site and can be used for walling e.g. at Douglasmuir (Kendrick 1995). Clay can also be used for mass walling e.g. at Thorpe Thewles (Heslop 1987) but is rather more rare due to its comparative unsuitability in a temperate climate.

Daub

Daub is used to insulate and protect wattle walls, to seal joints between contiguous timbers, or to plaster over wattle screens. Daub is made from equal parts of clay and soil, with an admixture of fibrous matter (e.g. animal hair, hay, straw, grass, brambles etc.) and liberal quantities of water. Alternatively, the house at Archaeolink used a mix of clay mud, straw, and sand (H. Murray pers. comm.). On boulder clays, material excavated from the drainage-gully might be used for

¹² Every 10m² of thatch uses 400 spars (Tabor 1994, 96).

daub (Inman *et al.* 1985). However not all communities would have ready access to clay deposits and here an alternative mix of cow dung and soil or chalk might be used, as in relatively modern vernacular traditions in southern England (Reynolds 1979, 35). The materials are trodden into a plastic consistency and the fibrous matter binds the daub to the framework upon drying (Reynolds 1993, 100). At RIA Camelon (Falkirk), a daub pit revealed a mix with a high grass content (Proudfoot 1977-78). Daubing the 6 m *Maiden Castle House* required 3.5 tonnes of clay, 3.5 tonnes of soil, 40 bales of straw and the hair of 40 pigs (Reynolds 1979). The 12.8 m *Pimperne House* needed more than 10 tonnes of daub and the 13 m *1998 Castell Henllys House* used 15 tonnes (Reynolds 1983; Bennett forthcoming). Such figures reveal the use of daub to be very labour intensive.

Thatch

We generally consider thatch to be of wheat straw or of reed – as these are the materials used in thatching over the last few centuries. Reynolds' (1983) agricultural experiments suggest that 2 tonnes of straw – with a stand height of 1.1 m - can be obtained from 1 ha of wheat. If so, the straw needed to thatch the average prehistoric circular structure – at 7.9 m - would be obtained from *c.* 4 ha of cultivated land: what might be considered a rather large area for communities engaged in subsistence-based mixed farming strategies. Experimental data – summarised in table 5.2 - reveals that water reed seems to be the more economically viable option, where available. Water reed is by far the best thatching material: lighter, longer – with lengths of 1.2-2.4 m – and more durable than straw, its character instigating more effective run-off (Fearn 1976; Wood 1995). It can be assumed that reed beds were a managed resource in prehistory with regular (annual) cutting taking place as the quality of reed becomes impaired if overcrowding of the bed is allowed (Fearn 1976, 6).

	Diameter	Type	Quantity	D:Q Ratio
Balksbury	9.0 m	Water Reed	3 tonnes	1:0.33
Pimperne	12.8 m	Combed Wheat Reed	6 tonnes	1:0.47
LDCD	15.0 m	Straw	10 tonnes	1:0.67

Table 5.2 Data on different thatch types from Butser constructs

Ethnography reveals that any suitable material in good supply can be used for thatching and we must also consider the use of other materials in prehistory. For example, rushes were found at Milton Loch and perforated birch bark at Forcegarth Pasture North CS K (Piggott 1952-53; Fairless & Coggins 1980). Birch bark roofing material was also preserved at the short-term structure at Ballyvourney I, Co. Cork (O'Kelly 1954). The Archaeolink house was thatched with heather and oat straw (H. Murray pers. comm.). Bersu's (1947-48) early arguments for the use of turf, however, whilst remaining a possibility in some small, short-term examples, can more generally be rejected as impractical in a precipitous climate (Reynolds 1993, 95; forthcoming,

219; contra Harding 1974). The weight of a turf roof would demand a 15-20° pitch, multiple ring-beams and corresponding post-rings (Reynolds 1993; forthcoming). Such evidence is lacking in the archaeological record and where more than one internal post-ring does exist, this can be accounted for by a corresponding increase in size. Those experimental reconstructions employing a turf-covering - whilst admittedly structurally unsound - have rapidly failed (Reynolds 1979; Waddington & Davies 2002).

Tying Materials

The junction of any two timber elements can be strengthened by tying and as such the quantity of tying materials needed should not be underestimated (Hansen 1959, 45). The *1998 Castell Henllys House*, for example, used around two miles of hemp rope and twine (Bennett 2001). Ethnographically, a wide variety of natural materials are utilised, including grass ropes, withes, reeds, vincs, creepers, saplings, rawhide, enset rope, sisal thread, the bark string of young trees, and bark itself. Use of rawhide in the *Maiden Castle House* - whilst initially good because it shrank to the timbers on drying - began to decay after 10 years, forcing collapse (Reynolds 1979, 33; 1988, 9). Sisal twine - a vegetable twine: the poor relation of hemp - was used in the thatching at the Museum of Welsh Life and still functions well in the *Moel y Gerddi House* after eleven years (Reynolds forthcoming; D. Price pers. comm.). The *Longbridge Deverill House* used farm/baling twine during thatching and is again fully functioning after eleven years (R. Hedge pers. comm.). Other materials occasionally used in late medieval thatching are stripped bramble stems or twisted hay strings (Moir & Letts 1999) but perhaps most common is the spar made from a twisted hazel rod. It is suggested that bark may also have been used as a tying material in prehistory and birch bark in particular is relatively easy to remove (Hodges 1989). Obtaining bark involves cutting along and around a branch or trunk; peeling the bark; cutting it into strips; removing the layer of cork; then rolling the strips for soaking (Hansen 1959, 33). In addition, withes can be twisted into a durable 'rope' and joinery techniques are also used (fig. 5.4).

5.2.2 Siting

The siting of a house must take several factors into consideration. Environmental concerns involve the provision of sunlight, light, and shelter in reaction to local topography, and phenomenological concerns involving the provision of a view. Socio-economic concerns involve being visible (or hidden) in the landscape and seeing across the landscape for purposes of security and control, the site must also be reasonably close to water, woodland, different land types for agricultural practice, and other resources. Proximity to other structures/settlements is a major factor and recent work by Chris Gosden and Gary Lock (forthcoming) has emphasised the

concept of a 'genealogy of place': each landscape has its own cultural history and construction takes place within that context. In addition, the siting of a house may be affected by non-normative, agent-based concerns. One in three structures in northern and central Britain are unenclosed (fig. 5.5). Of the enclosed structures, one in five are located within an elaborate enclosure: an enclosure with two or more enclosing features.

The majority (65%) of structures are located on a hillslope (fig. 5.6). Most are on the lower slopes, at or below 200 m above sea level (fig. 5.7a). One in four structures occupy a summit or ridge location and a similar proportion (27%) utilise a platform. Just one in ten are in the valley. The choice of slope orientation is reasonably varied, which presumably reveals the importance of local topographic conditions (fig. 5.7b). There is, however, a slight preference for south to east-facing and west-facing slopes. It is often maintained that the uplands are a 'marginal' environment, occupation of which implies pressure on land (cf. Barber 1997). Such a view is also traditionally held in ethnography but it has been accepted in the latter discipline that hill communities clearly are not *forced* to live in the hills but that their subsistence strategies offer a long-term response to a *chosen* and often very pleasant environment (Denyer 1978). A moderate slope location is ideal as it provides the potential for exploiting a broad spectrum of resources within the wider landscape (Heslop 1987). What is clear is that there is a marked difference in house size between structures located in valleys and on level ground and those in the hills (fig. 5.8). In addition, stone walled structures are least popular at lower altitudes where post-built structures are more popular; and stake-and-wattle structures are more popular at higher altitudes (fig. 5.9).

5.2.3 Orientation

Ethnography reveals that orientation is a marriage of many different factors. Environmental concerns involving the provision of light and shelter in reaction to local topography, whilst clearly important, remain one of many. It remains a possibility that orientation towards the sun from autumn to spring was as a result of overtly symbolic concerns but the arguments put forward for this have so far been unconvincing (Pope forthcoming). Phenomenology is another factor and the use of viewsheds at the site of Crick has revealed that domestic structures have a wider variety of views than do ancillary structures (Woodward forthcoming). Privacy might play a role, as orientation provides an opportunity for occupants to be visible/hidden in the wider settlement. Similarly, seeing the wider landscape may have implications regarding security and resource control. Whilst the orientation of both unenclosed structures and structures within enclosures is based firmly around ESE (see below), the orientation of enclosures is slightly more erratic, suggesting that other factors were influential. Nevertheless, the majority (54%) do have their main entrance oriented between north-east and south-east (fig. 5.16) and

perhaps the sun played a more important role determining enclosure orientation at some sites as suggested by Hill (1993).

Orientation is only known for 66% of structures. Three in four structures (76%) are oriented between north-east and south, most (48%) between east and south-east (fig. 5.10). Recent studies have linked orientation to ideas of sun worship (see 2.3), however, if orientation were based around ritual concerns with the sun, it is strange that the direction of north-east (summer sunrise) is so much less popular than east and south-east. For this reason we can also be fairly sure that orientation does not point to sunrise on construction. The current author suggests that environmental concerns have been too readily rejected in recent studies. The provision of shelter requires a structure to be oriented away from the prevailing westerlies. In structures where evidence from ethnography suggests that the door was the main source of light, orientation must also favour the southern sky. In addition, orienting towards the morning sun provides sunlight and warmth. As a result, what can be called the *functional optimum* for roundhouse orientation lies at ESE (fig. 5.11) and this corresponds well with the orientation of 800 prehistoric and RIA structures from north and central Britain. Naturally, this is a generalised model and does not account for local level climate and topography or other orientation-defining factors but the correlation is, nevertheless, unequivocal and suggests that environmental concerns did play a dominant role in structure orientation.

Polarisation around east and south-east has been over-emphasised in recent years as a result of distortion from the site of Moel y Gaer¹³ in Oswald's (1991) relatively small dataset, where the site accounts for 13% of the sample. With a dataset of 800 structures – after distorting sites have been removed – we see a more general spread between east and south-east. Rather than ideas of sun worship we might consider the role of seasonality in orientation. Sunrise shifts throughout the year which means that the *functional optimum* also changes according to the season: at midsummer optimum orientation is towards east; at the equinoxes it is ESE; and at midwinter it is SSE (fig. 5.12). In concentrating orientation around east to south-east we are perhaps seeing the functional optimum for autumn through to spring being planned for during summer construction. Might then variation in orientation reveal seasonal patterns of occupation? ESE to north-east is the functional optimum from spring to summer and ESE to south is that for autumn to winter. If we divide the number of structures facing ESE in two, we find that of those structures least affected by local topography – i.e. those that do conform to the functional optimum – slightly more than one in two might be seen as a seasonal structure (table 5.3). We might expect such structures to be well-represented in the record because of their shorter

¹³ At Moel y Gaer the excavator commented that the standardisation in orientation might be accounted for by the fact that only the south-western quadrant of the site had been excavated and that houses facing the hillfort entrance in the ESE would necessarily be oriented in an easterly direction.

lifespan. Fig. 5.13 reveals that summer structures are more likely to be found at above 200 m above sea level with winter structures more common on the more moderate slopes.

Summer Orientation		Winter Orientation	
NE	51	S	37
ENE	70	SSE	42
E	134	SE	107
ESE (½)	50	ESE (½)	50
Total	305 (56%)	Total	236 (44%)

Table 5.3 Evidence for seasonal structures in the orientation data

Figs 5.14-5.15 reveal a model of prehistoric land-use based on the architectural evidence, using information from tables 5.3-5.6. It is suggested that most members of a household occupy the main residence on the moderate slopes from late autumn to early spring. In late spring more of the landscape begins to be utilised. In early summer much of the household has joined members of other households from the wider landscape – perhaps in a large upland enclosure - where craftworking and socialising takes place, as members of this wider community reside in seasonal structures. In late summer many retreat to their main residence to take part in the harvest and in autumn the household spends more time in the lowlands preparing for the winter. We might now be able to identify seasonal sites; at ELA Garton-Wetwang, for example, 79% of the structures are oriented between east and ESE and there appears to be a zoning of orientation across the site from west to east. This suggests a shifting pattern of seasonal occupation.

	Orientation
Spring	ESE & E
Summer	ENE & NE; E (early & late)
Autumn	ESE & SE
Winter	SSE & S; SE (early & late)

Table 5.4 The functional optimum for orientation according to season

	Main Orientation	Main Use	Additional Use
0-100 m	E; & ESE-SE	late summer – early winter	spring
101-200 m	SE; ESE; E; SSE; ENE	year round	-
201-300 m	E; SE; ENE; S; ESE; NE	year round	-
> 300 m	E; ENE; ESE; SE; NE; SSE	spring-summer	winter

Table 5.5 Seasonal structures in the landscape from the orientation data

	Lowlands	Lower Slopes	Upper Slopes	Uplands
Winter		•	•	•
Spring	•	•	•	•
Summer		•	•	•
Autumn	•	•	•	

Table 5.6 Seasonal use of the prehistoric landscape

5.2.4 Site Preparation

Following the transportation of materials to the site and prior to construction, the site itself must be prepared. This entails the clearing of any vegetation, deturfing, and levelling the ground. In upland landscapes a semi-circle is quarried upslope and the material shoveled slightly downslope to create a circular 'platform'. Usually on gentler slopes a circular 'scoop' is quarried, in some instances creating a sunken floor (fig. 5.17). The term *platform* is generally used to refer to both types. Platforms themselves are not a distinct architectural or cultural tradition but are instead a natural response to slope topography (Gardener & Savory 1964; Owen 1992; Barber 1997). Scarp height is variable - between 'barely perceptible' and c. 3.6 m high at Green Knowe (Feachem 1960-61) - and is dependent on the gradient of the slope. In some, quarried material was presumably used in the construction of the wall (Hill 1982b). Earlier interpretations suggested that a post-ring - usually c 5 m in diameter and set c. 2 m back from the scarp edge - was the outer wall of the structure. However this would allow rainwater to drain into the space behind the rear of the structure (Musson 1970a). Instead a turf wall can be seen as surrounding the shallow scoop - built slightly higher at the front to keep the wall-plate level. Alternatively, with higher scarps, to the rear the ground absorbs the weight of the roof and a mass wall is provided only at the front - as at the Dunion (fig. 5.18). At Ty Mawr, however, a wall was built *inside* and against the scarp (fig. 5.19).

Next comes the process of laying out. The Kipsigis use small sticks as guidance (Peristiany 1939, 154). The Gurage drive a peg into the centre of the levelled ground, tie a rope to the peg and a sharp stick to the other end of the rope. The rope is kept tight and a circle is drawn on the ground (Gebremedhin 1971, 115). It is clear from the high proportion of double-ring structures which use a degree of symmetry in their post-ring that such a process was used in prehistory (see 4.3.3). Once the plan of the house has been laid out, the features must be dug. It is commonly understood today that posthole depth should be the equivalent of $\frac{1}{4}$ of post length (Hansen 1959; Jobcy 1962). To help create post stability, posthole width should not be too much larger than the diameter of the post (Reynolds 1983) and this technique was noted at Moel y Gaer (Guilbert 1976). The problem is that such a hole can only be as deep as the arm can reach to clear out soil (Reynolds 1983). Where a greater depth is needed - for longer posts - the posthole must be widened and subsequently packed. It is important that the wall-plate is level. At Swarkestone Lowes, posthole depth took account of the 3-4° downwards slope, suggesting that the timbers had been cut to a set length and that the postholes were tailored to them accordingly; the same was found at Newmill (Guilbert & Elliott 1999; Watkins 1978-80b).

One might imagine that part of site preparation would lie in providing drainage, however if construction took place in summer, water levels would be low and digging a drainage ditch prior

to construction would impede progress. In a modern Italian shepherds' hut the upcast of the drainage-gully was against the wall, revealing drainage on the site to be a final phase activity (Close-Brooks & Gibson 1966). One in five structures are provided with a drainage gully, or stormwater ditch, positioned on average 0.95 m from the structure wall which might suggest that these features also perform an eaves-drip function. Evidence for naturally-formed eaves-drip features was not forthcoming nor has it been in experimental structures where the feature was essentially ephemeral: marked only by an increasingly lush growth of vegetation (R. Hedge pers. comm.). Drainage gullics are on average 0.75 m wide and 0.36 m deep and have an average 4.0 m wide gap at the entrance. As one might expect, fills consist predominantly of silts, often with an admixture of redeposited natural presumably from the slumping of an upcast bank. One in ten have additional features such as run-off gullies and sumps. Drainage-gullies are generally provided on poor-draining clays and the excavated material might well have been used for daub as inferred at Roxby CS 1 (Inman *et al.* 1985).

5.2.5 Foundation Deposits

At some sites ritual deposits were made prior to construction. Such a practice is relatively rare in the dataset but is particularly well known on the Western Isles. The best example in the dataset is at LrIA South Shields where an adze complete with broken haft was deposited in a pit at the rear of the structure (Hodgson *et al.* 2001). The fact that the wall-slot cuts the edge of the pit reveals that deposition took place prior to house construction. The adze was deposited against the wall, diametrically opposite the doorway. At RIA Huckhoe, an unworn coin was found in the make-up material of the house site and at Milton Loch the broken stilt and head of a wooden plough were found beneath the foundations of the crannog (Piggott 1952-53). Whilst both could receive a normative interpretation - the former loss, the latter re-use of timber - the weight of the evidence from elsewhere might move against this. Finds in non-structural features such as drainage gullies could be deposited at any stage in a sites history but at LrIA Thorpe Thewles CS D, a beehive quern had been deposited in the drainage-gully terminal prior to the accumulation of the primary silt (Heslop 1987). It is possible then that deposition in drainage gullies is an event which takes place during house construction. The most popular finds in drainage-gullies are quernstones and metalworking debris and this appears to be a predominantly LrIA tradition (see Appendix 4.7).

Perhaps the most secure evidence for foundation deposits is that provided by what might be called *constructed deposits*. These involve the inclusion of material in a constructed context such as the packing material for a posthole, or the core of a wall. Quernstones, for example, are commonly found inverted in the paving of ring-ditches a tradition with origins in the Bronze Age. It can be argued, however, that the inclusion of quernstones in built deposits may be a

result of the normative re-use of stone and this remains a possibility in each of the examples given. Quernstones, however, are not easily acquired and it is perhaps difficult to see their inclusion in such contexts as having *no* symbolic meaning particularly when other types of stone are reasonably ubiquitous, and especially when the house itself is built of stone. Quernstones are also found as packing in structural features and this appears to be a predominantly LrIA tradition, perhaps with earlier origins (Appendix 4.1). At LrIA Ballacagen Lough B Ph I a stone axe was deposited between the packing stones of a single post near the central hearth (Bersu 1977, 39). It is tempting to see the Ballacagen axe and the South Shields adze as being tools used in the construction of the house.

The most common deposits built into walls are again quernstones, but also potsherds, in a predominantly RIA tradition with LrIA origins (Appendix 4.2). It could be argued that potsherds might inadvertently be included during the construction of a wall, however few appear to be obviously residual and the care taken in the construction of a drystone wall core (see 5.3.3) also moves against this conclusion. There are hints of complementary LrIA-RIA traditions involving the inclusion of perforated and cup-marked stones – perhaps reminiscent of querns – such as whorls, loomweights, and stone lamps which were in four cases found where no quern had been deposited (table 3.5). Another is the inclusion of metal artefacts in walls, for example a coin at Bridge House CS 4 and at Crossgates CS 4, a La Tène I iron brooch at Bonchester Hill CS III, a piece of bronze sheet at Caerau I CS IA, and a bronze nail-cleaner at Hownam Rings CS 2. There was found to be no major practice involving the inclusion of material in paving; however at MBA Bracken Rigg CS 1, a whorl was included in this context and at RIA Forcegarth Pasture South CS 2, the paving included fragments of rotary quern and a loomweight.

5.3 Construction

5.3.1 The Construction Process

When were they built?

Using the work of Gill Campbell & Julie Hamilton (Cunliffe 2000, fig. 3.10), the current author believes that the optimum time for construction in the prehistoric farming year is midsummer, between roughly mid June and the end of July in southern Britain and into August further north (fig. 5.20). At this time lambing and calving activities are at an end, the animals are out to pasture, and the harvest has not yet begun. Only minor agricultural tasks are taking place at this point in the year. The weather is warm and dry, ground water levels are low, and the days are long: ideal working conditions. The coppicing of wood begins in September and continues until early spring whilst withes become available between March-June (Tabor 1994; Cunliffe 2000;

Murray forthcoming). Timber was probably seasoned for some time prior to construction and rods and withes can be stored easily in tied bundles. Dry withes are still easy to use in construction so long as they have been steeped in water for 24 hours prior to use. Reed is best cut in winter after the frost has killed the leaves (Fearn 1976, 6) and is also easily stored. Straw is available after the harvest, following construction. Difficult to store, it would have required immediate use. Oak bark becomes available only in the 'sap-peeling season': for six weeks in May-June but can also be stored dry and steeped in containers or pits of water prior to use (Aaron 1976, 25; Sparkes 1977, 4; Hansen 1959, 33). Midsummer is also an ideal time for daubing as this activity must be carried out when there is no chance of frost (Murray forthcoming).

Who were the builders?

Reynolds suggested that construction was not a group exercise and that only two men [sic] are needed, with any more being counter-productive (Reynolds 1993, 100). Reynolds' first 4.3 m timber structure took seven men five 5-hour days, or 175 working hours (Reynolds 1967, 5). At the second *Conderton House*, the walls took one man six 10-hour days. The wall-plate and roof took one man five days. The thatching took two men five days. In total, the 6.1 m stone-walled structure required 210 working hours. Construction is then a task accomplishable in three weeks for one person; or in one day for twenty people. In traditional African architecture, everyone in the community gets involved, as occasionally do their neighbours (Andersen 1978, 82; Denyer 1978, 92). House construction is a major social event and an opportunity to pass on craft skills to the younger members of the household or community (Denyer 1978, 93; Oliver 1987, 69-70). It is assumed that house construction was not a specialist task in prehistory (contra Reynolds 1983, 188-189), due not least to the real variety of house styles in the archaeological record and the lack of standardisation in style even within a local area. The only site which might indicate specialist construction is LBA-EIA Moel y Gaer (Guilbert 1975b; 1976) – details of which will be clarified upon publication.

It has been assumed in (male) archaeology that it was prehistoric man who undertook the more skilled construction tasks. For example, "it was probably the women who did most of the kneading of clay and who daubed it into the wattle, for the men would have had enough to do cutting the timber and fitting the rafters" (Hansen 1959, 38). Reynolds describes the preparation and application of daub as the most tedious task in house construction: one that would be undertaken by women and children as men thatched the roof (Reynolds 1967, 7; 9). The above quotes tell us nothing of prehistoric construction; they simply display our own modern, androcentric attitudes. Such attitudes are often affirmed by the application of formal ethnographic analogy and this has worked well as many modern African societies do distribute set construction tasks according to sex. For example, Kipsigis men clear the site; cut the wood

and tying material; and build and thatch the structure. The women carry the wood; cut and carry the thatching grass and leaves; and young girls plaster the walls (Orchardson & Matson 1961, 85-86).

It was not until the late 1970s and 1980s - with the work of some of our first female architectural ethnographers - that we discover that our understanding is biased. In fact, it is more generally the *women* in African societies who undertake such specialist tasks as thatching whilst it is generally the men who fashion the walls (Denyer 1978, 92). Similarly, we discover that there are some communities, like the Tswana, where it is the women who are responsible for not only collecting the materials, but also for building, thatching, and maintaining the house (Larsson 1989, 508). We also discover that there is a widespread custom of competitive *joking* between men and women regarding their respective tasks: a traditional light-hearted 'teasing' (Denyer 1978, 92). Only then do we begin to consider that sex-based task distribution may have less to do with the concept of male primacy and might have more to do with social interaction; less to do with power and more with sex. In a male-dominated anthropology and archaeology we find the labour of ethnographic and prehistoric women to be passive and unskilled, even on a par with that of children. In fact we have to consider that this is simply a feature of our own making and not a universal truth.

How were they built?

Fig. 5.21 shows Reynolds' construction sequence. This sequence is supported in the ethnographic literature and has been tried and tested experimentally. The wall-plate and main ring-beam - raised on the wall and internal post-ring - work as props for the principal rafters during construction. In this way the structure utilises the inherent structural properties of the wigwam form: the ground absorbing most of the weight of the roof during construction but by the time construction is complete the load has been converted into horizontal form around the ring-beams and the wall. As suggested by Reynolds (1993; forthcoming) the structure becomes self-supporting following construction. This was confirmed at Castell Henllys following post-end decay in the internal post-ring (Bennett 2001; forthcoming). Where Reynolds' sequence does not succeed, however, is with stake-built simple-rings: the slight walls being unable to take the thrust of the rafters.

An alternative for these cases, is offered by the 5 m diameter Italian shepherds' hut where a prefabricated roof frame is attached to the wall with a woven wall-plate (Close-Brooks & Gibson 1966; Erixon 2001). Prefabrication of the roof frame is a serious option but would only be suitable for smaller structures. In larger structures the use of scaffolding during construction might be a further alternative, as demonstrated at Castell Henllys (Bennett 2001) and perhaps most securely identified at Aldclune 2 (Hingley *et al.* 1997, 426). At Wanlip CS 2, the

correlation between rafter positions and angles in the polygonal wall-slot suggested an alternative construction sequence, following rejection of the hypothesis that the polygonal shape implied use of prefabricated hurdles (Beamish 1998). Using Beamish (1998), one might advance an alternative sequence to that of Reynolds for a stake-walled double-ring structure (fig. 5.22) and this must be tested via experimental reconstruction. Section 5.3.2 is nevertheless based on the Reynolds' method which remains the best method for the majority of structures.

5.3.2 The Framework

Roof Supports

Construction of the framework begins with the roof supports. These are large timbers and must be sunk before the other elements restrict access to the centre of the structure. The internal post-ring provides the basis for the main ring-beam and must be both stable and level (Reynolds 1993, 94). This requires precision both in the length of wall uprights and the tailoring of negative features to suit them. Posts must be reasonably equidistant but their precise spacing is not crucial (Guilbert 1976). On average they are spaced at 2.0 m (c. 1.8 m in post and stake-built structures; c. 1.9 m in mass wall structures; c. 2.3 m in the stronger wall-slot structures). The large entrance posts might also be sunk at this point. At Rispain Camp a ramp at one side of the entrance posthole was interpreted as where the post had been eased into the hole and similar features were noted at Lintshie Gutter (Haggarty & Haggarty 1983; Terry 1995a).

Ring-Beam

The main ring-beam is then fixed on top of the post-ring uprights. Made of twisted withes in smaller structures, or timber beams in larger examples, it acts to stabilise the uprights, decreasing lateral movement in the posthole. Its task in construction is to transform the individual uprights into a single unit: a cylinder strong enough to contain the lateral thrust exerted by the principal rafters. The ring-beam also serves as a place to fix subsidiary rafters once the apex and upper ring-beam are full. At the *Balksbury House* a pentagonal timber ring-beam was prefabricated on the ground and hauled into position with a rope (Reynolds 1979, 37). At the larger *Pimperne House*, each post was jointed in turn and the oak branches of the ring-beam fitted in place with mortice and tenon and pegged scarf joints (Reynolds 1993, 97). In the average prehistoric structure the main ring-beam was positioned at slightly less than two-thirds of the way down the roof from the apex (see 4.3.2). In a 7 m diameter with a 1 m high wall the 1:0.63 ratio means that the main ring-beam is 2.3 m from the ground – low enough to be reached by a person 5' 10" in height. A larger diameter structure may require the use of ladders, or scaffolding at this point. The ring-beam is used as the basis for an attic/loft floor.

Wall Height

Following completion of the internal cylinder, construction of a level outer cylinder, the wall, begins. At this stage, only the skeleton of the wall is constructed in timber-built structures. Posts are spaced at c. 1.7 m, stakes driven at c. 0.50 m. The main problem at this stage is deciding on wall height as this has a role in determining roof pitch (Reynolds 1979, 33). The first reconstruction drawing envisaged a c. 1.8 m high wall (Kilbride-Jones 1938) and Bersu (1940; 1947-48b) increased this to 2 m (fig. 5.23). Piggott (1948-49) preferred a wall 0.9-1.2 m, a height accepted by both Steer (1955-56) at West Plean and Jobey (1962) at West Brandon. Feachem (1965), however, envisaged wall height as between 1.4-1.8 m. Following Feachem, wall height has seen larger, lowland structures reconstructed with more headroom than smaller, upland structures (table 5.7). A c. 1 m turf wall was only envisaged for the c. 10 m diameter structures at low-lying Douglasmuir because a ring-ditch provided increased headroom at the wall (Kendrick 1995). These ideas regarding headroom might have origins in a mistaken understanding that wall height is proportional to house size but they are also clearly rooted in ideas of progressive development which see earlier/smaller/upland structures as less 'civilised' than their later/larger/lowland counterparts. Latterly, a 1.5 m figure has been reinforced by the work of Peter Reynolds at Butser. Nevertheless, a 1.2 m high wall was used in the *1998 Castell Henllys House* (Bennett 2001): an upland site.

	Wall Height	Diameter	Altitude	Platform	Reference
Glenachen Rig	0 m	7.0 m	297 m	Y	Feachem 1965
Kilphedir	0.5 m	11.0 m	120 m	Y	Fairhurst & Taylor 1970-71
Drumcarrow	0.9 m	7.3 m	198 m	N	Maxwell 1967-68
Pimperne	1.5 m	12.8 m	107 m	N	P. Reynolds 1993
West Plean	1.8 m	12.2 m	116 m	N	Feachem 1965
Broxmouth	2.0 m	17.5 m	25 m	N	D. Reynolds 1982
Bannockburn 2	2.0 m	14.5 m	35 m	N	Rideout 1996

Table 5.7 Wall height reconstructions

The average height of a prehistoric stone wall – removing plough damaged, robbed, and poor quality data – is 0.83 m (fig. 5.24)¹⁴. Ring-banks (see 4.2.3) tend to be shorter than stone walls – at an average height of 0.51 m – presumably because increasing height with turf was more common in these types of structure (fig. 5.24). The average height of a platform scarp is however remarkably similar to that of a stone wall, at 0.80 m (fig. 5.25). The average depth of an outer wall timber feature – removing plough damaged data – is 0.29 m which, if 25% of the upright is sunk, provides a wall 1.16 m high. The stone wall and timber-built figures together provide an average prehistoric wall height of c. 1 m. This is supported to some extent by evidence from eaves-posts. The distance between the eaves feature and the wall will be roughly similar to wall height where the roof is at 45° (Reynolds 1983, 181). It is expected that the

¹⁴ It is possible that stone walls were capped with turf thus increasing overall height. Whilst this is not recommended practice for long-term stability it may have been used in short-term or seasonal structures.

distance would, in fact, be slightly *less* than wall height as these features do not necessarily represent the rafter butt (contra Reynolds 1993). The average distance between the two is 0.92 m. One might assume that a 1 m high wall would restrict headroom against the wall. The addition of a wall-plate and rafter butts means that headroom may be increased by *c.* 0.20 m at this point (cf. Reynolds forthcoming, 220). As a result, a 1 m high wall – in any size of structure with a 45° roof – provides 1.80 m (5' 9") of headroom at just 0.60 m (2 feet) from the wall. This decreases to 0.50 m if roof pitch is at 50°. Headroom then is not seriously compromised with a 1 m high wall. Photographs in the ethnographic literature reveal that it is not uncommon to find structures with walls *c.* 1 m high (Denyer 1978, figs 180, 229, 245; Oliver 1987, 145).

Wall-Plate

The mass wall or wall frame is then topped with a wall-plate, thereby completing the second cylinder. A wall-plate performs the same tasks as the ring-beam on top of the post-ring. Smaller structures may use forked poles as wall posts so that a woven rod wall-plate can rest in them (cf. Hansen 1959), although timber beams rest on the post tops in larger structures. Early reconstruction drawings did not visualise the use of a wall-plate, instead each rafter corresponded with a wall upright (Kilbride-Jones 1938; Brewster 1963; Feachem 1965). Reynolds first discovered the need for a wall-plate during the construction of the first *Conderton House* (built in 1969-70) when the principal rafter tripod – weighing more than 100 kg - caused the wall to collapse outwards in the three areas of contact. It was thus found necessary to spread the load of the roof *around* the wall instead of letting it focus on the butts of the principal rafters. This was achieved by placing baulks of timber (2.4 m long) around the wall top. By trial-and-error experimentation, it was found that the wall-plate was best placed at just 0.30 m in from the internal face of the 0.91 m wide wall. At this point the pressure line from the roof passes diagonally through the bulk wall allowing the outer element to act as a buttress.

Joining Timbers

Fig. 5.26 shows the main joining techniques known from early prehistoric contexts. At the *Conderton House* the timbers of the wall-plate were joined with scarf joints, pegged half-lap joints were used for the second (Reynolds forthcoming, 226). At the *Balksbury*, *Pimperne* and *LDCD Houses* mortice and tenon joints were used (Reynolds 1979; 1983; 1988; R. Hedge pers. comm.). A key stage in construction is joining the rafters to the wall. Hansen (1959) found that bark ties were not strong enough at this stage in construction. He instead used joinery and lashed with bark as a secondary method once the initial framework was in place. By flattening the surface where two timbers meet, slippage is reduced and this, in turn, reduces strain on the tying material (Hansen 1959, 42). The collapse of the *Maiden Castle House* showed that joinery is perhaps preferable to lashing - the latter forces a rigidity which does not allow for shifting within the structure (Reynolds 1988, 9). At the first *Conderton House*, the rafters were prepared

with a half-lap joint so that half the butt sat on the wall-plate as a 'tail' extended beyond onto the wall (Reynolds 1983; forthcoming). At *Pimperne*, they were notched onto both the wall-plate and main ring-beam and a peg was driven through latter (Reynolds 1993, 98). Thirteen RIA structures – twelve from Northumberland – had iron nails on their floor which *may* be evidence that roof joints were held together by nails during the early centuries of the 1st millennium AD in this area.

Principal Rafters

Following traditional interpretation – stemming from Kilbride-Jones (1938) – Reynolds' first reconstruction (the first *Glastonbury House*) had 19 rafters to correspond with its 19 wall uprights (Reynolds 1967, 5). Realising that the major component of a cone is a tripod, his first *Conderton House* instead began with three principal rafters, their narrow ends lashed together at the apex (Reynolds forthcoming, 220). Three more principal rafters were added once the tripod was in position, filling the apex (Reynolds 1983, 196; forthcoming, 220). This method was also used for Reynolds' first double-ring structure: the *Pimperne House*. At *Conderton*, the butts of the principal rafters had rested on the wall and wall-plate during construction. The same technique was used for the *Balksbury House* but the structure failed (Reynolds 1979, 37). At *Pimperne*, it was found that the butts of the principal rafters were too heavy to rest on the wall frame and instead rested on the ground (Reynolds 1983, 181; 1995, 98). The ground provides support for the principal rafters during construction, whilst the main ring-beam and wall-plate – raised on the post-ring and wall – act as props. Joining the principal rafters to these elements works to hold the cone together as they prevent the rafters from splaying outwards. It is critical that the cone of the roof is exactly centred and this must be checked before the roof frame is secured (Reynolds 1983, 180). Following completion of the *Pimperne House* the ground was dug away from beneath the principal rafters proving that, following construction, they were no longer load-bearing. As a result they could be cut or left to rot to above the level of vegetation – c. 0.23 m above ground level (Reynolds 1993, 99; R. Hedge pers. comm.).

Roof Pitch

The principal rafters of a circular structure are joined at the centre of the structure to produce a constant roof pitch. In an oval structure, joining the principal rafters at the apex can create design problems as the pitch across the structure is steeper than that along its length. The solution to this problem can be found in the use of a ridge-pole, or more correctly a ridge-piece, to provide an extended apex along the longitudinal axis thereby keeping pitch constant. Early ideas suggested that as size increased so roof pitch decreased. These ideas were perhaps fuelled by ethnographic examples such as the Pokot where the smaller agriculturalist structures are pitched high and the larger pastoralist structures low (fig. 5.27). Bersu argued that the larger, lower pitched structures were covered with turf as opposed to thatch: an idea that can now be

rejected (see 5.2.1). Instead Reynolds has argued for a constant pitch of 45° for 'practical, mathematical, and economic reasons' (Reynolds 1983, 180). The lateral pressure exerted on the wall of the structure is least at 45° and most at 22.5° and 67.5° (*ibid*, 193). Reynolds suggests that heather, reed, and straw all need a pitch of 45-55° to be waterproof and that of these a 45° pitch has the least surface area and thus requires less materials (Reynolds forthcoming, 219; 1979, 33). A higher pitch also requires larger timbers.

Reynolds reconstruction of the *LDCD House* has proved that it is possible to maintain a 45° pitch at a diameter of 15 m. Other sources suggest that a thatched roof must have a pitch of *at least* 50° to ensure effective run-off (Fearn 1976, 9). This was apparently confirmed by Jacqui Wood (1995) at her experimental Bronze Age site in Cornwall. Reid (1993) has also suggested that roof pitch may have been slightly greater than 45°. A 50° angle requires a constant 0.9 m extra length of principal rafter than that required for a 45° angle. During interpretation of the structure at Wanlip, it was suggested that a higher wall could be achieved by increasing roof pitch (Bcamish 1998). This idea was tested. A number of scale drawings were made – with the post-ring positioned at 1:0.615 (see 4.3.2) – to find out under what circumstances the wall and post-ring would each take *c.* 50% of the load of the roof during construction. The results are shown in table 5.8. It is suggested that 50° would be the ideal roof pitch, as it increases wall height and allows increasingly effective run-off whilst not demanding too great an increase in rafter length. If stone-walls have an average height of 0.93 (including *c.* 0.10 m for the wall-plate) they might prefer a 45° angle (which would also exert the least pressure on a drystone wall). The same can be assumed for ring-bank structures. In timber-built structures, however, where average wall-height (including a wall-plate) is 1.26 m, an angle of between 50-53° might be preferable.

Roof Pitch	Wall Height (m)
45°	0.9
48°	1.1
50°	1.2
53°	1.3
55°	1.4

Table 5.8 Structurally sound arrangements of roof pitch and wall height

Upper Ring-Beam

Once the principal rafters are in place, an upper ring-beam is constructed at one third of the way down the slant height of the roof: a height reached by climbing up the principal rafters, or by using ladders or scaffolding. In this position a ring-beam counteracts rafter sag by stressing the rafters outwards whilst also redistributing the load horizontally and providing a base for the subsidiary rafters. The upper ring-beams at the *Pimperne House* and at *Longbridge Deverill* were also cross-braced (see 4.3.1) – a technique recorded by Close-Brooks & Gibson (1966) –

and also used at Castell Henllys (Bennett 2001). Such a technique requires relatively sophisticated joinery.

Subsidiary Rafters

The subsidiary rafters are of a smaller diameter than the principal rafters – just 0.05-0.06 m in the modern 5 m diameter structure recorded by Close-Brooks & Gibson (1966). At the 10 m *Greenbogs House*, the rafters were 0.08-0.10 m in diameter (H. Murray pers. comm.). At *Pimperne*, the opposing tripod rule was applied regarding the positioning of subsidiary rafters so that a disproportionate stress was never applied (Reynolds 1993, 99). Shorter rafters are positioned at the doorway so as to decrease the eave overhang and maximise headroom. In Reynolds' structures the subsidiary rafters are attached first to the upper and then to the main ring-beam once the apex is full (fig. 5.28) and tied wherever timbers meet. The rafters of the first *Conderton House* were then woven with willow withes to produce a strong basketwork roof. An alternative – one that Reynolds preferred – is the use of purlins.

Purlins

Reynolds tied horizontal rings onto the rafters and it was onto these that the thatch was secured. The correct term for Reynolds' use of these rings is 'laths' however Reynolds' (1979; 1995) use of the term 'purlin' – whilst technically incorrect – has been largely accepted. In fact, a purlin rests on the principal rafters and supports the subsidiary rafters. Alternatively, purlins can be tied to the underside of the principals (fig. 5.29). Purlins act as additional ring-beams. If only six principal rafters are employed, however, a purlin ring would be hexagonal rather than circular which is presumably why Reynolds did not use horizontals until all of the rafters were in place. An alternative method is suggested which – by adding a purlin between the upper and main ring-beams once the upper ring-beam is full – would create an increasingly self-supporting roof (fig. 5.30). A heavy purlin is also attached to the rafter butts.

Laths

The structure is then ready for the addition of laths: the final element which prepare the roof for thatching. At the second *Conderton House* hazel rods were lashed onto the rafters in concentric rings a handwidth apart (Reynolds forthcoming, 227). At the *Pimperne House*, they were laid 0.20 m apart in prepared axe-cut notches in the rafters. At the 1998 *Castell Henllys House* the rings were placed c. 1 m apart (Bennett forthcoming). Following this, the roof frame is complete. Reynolds sequence works on the principle that prehistoric walls were of wattle and daub. As a result it is at this stage in the construction sequence where attention turns to adding to the skeleton of the wall with wattle. Mass walls and those of contiguous timbers set in a wall-slot, however, need little further work at this point. Nevertheless all wall-types are dealt with in section 5.3.3 for the sake of cohesion.

5.3.3 The Wall

Timber Walls

Wattling

It is traditionally assumed that where a post-ring provides the skeleton of the wall, wattling is used to create the wall itself. A distance of 0.60 m between uprights is apparently ideal for *in situ* wattling and where recorded ethnographically, wall posts are positioned between 0.20-0.46 m apart (Hansen 1959, 33; Andersen 1978, 155; 226). The prehistoric spacing of stakes at an average of 0.5 m does suggest the practice of *in situ* wattling. The wall-posts of the *Balksbury House*, however, were spaced at 1.92 m. The structure failed and it was subsequently accepted that the post-ring did not represent the outer wall of the structure (Guilbert 1981, 302; Reynolds 1988, 13). The posts of the *Maiden Castle House* were spaced at a shorter distance than at *Balksbury* but were still much wider than Hansen's 0.60 m. Again there were problems and Reynolds maximised the strength of the wattlework to counteract the weakness of the widely-spaced posts. The pressure of the strong wattle walls at the *Maiden Castle House* was sufficient to spring the doorposts slightly outwards at their top (Reynolds 1979, 33). Open wattle is very draughty, as confirmed by the reconstructed crannog on Loch Tay which is distinctly chilly – despite the use of animal pelts – even on a warm day. The daubing of a wattle wall works to conserve heat. It is suggested that wattle-and-daub walls are most likely on clay sites where excavation of the drainage-gully would provide an immediate resource of clay which is otherwise heavy to transport.

Wattle Alternatives

The average prehistoric spacing of outer wall posts, at 1.7 m (2.05 m in triple-ring structures), is considered rather too wide for the practice of *in situ* wattling. An alternative method must have been used in the majority of post-built structures. There are five possibilities: 1) prefabricated wattle hurdles; 2) prefabricated timber panels; 3) horizontal timbers fixed together with tongue and groove (cf. Brewster 1963); 4) use of vegetation; 5) use of turf. Each of these would be preferable to the distortive properties of *in situ* wattling and each would leave no archaeological trace. In the post-built shepherds' huts of the Italian campagna the 0.30 m wide walls are of straw and plaited reed. Fixed onto the outer line of the post-ring they are held in place by horizontal withes (Close-Brooks & Gibson 1966; Erixon 2001). Whilst a possibility, it is suggested that the use of vegetation walls like these would only be suitable for short-term summer structures in prehistory. In addition, types 1-3 would create a polygonal wall and in wall-slot structures just eleven (3%) revealed such a shape (fig. 5.32). Nevertheless, the high proportion of wattle and daub found in postholes – compared with that in wall-slots – might confirm the use of daubed wattle hurdles at some sites (fig. 5.31). It is the final option, turf,

which is seen as being the main component in a post-built wall, perhaps utilising suspended wattle hurdles as lining. The turf acts as infill between the spaced posts, whilst the latter take the main thrust of the roof.

Contiguous Timbers

Evidence from wall-slots suggests that 30% of prehistoric walls – the greatest single type - were of contiguous timbers (fig. 5.32). Such walls are apparently rather strong (see 4.3.1; contra Mercer 1981) and this might imply that increased strength was achieved by connecting one upright to the next. At Bannockburn Homestead CS 1 Ph.2 the planks overlapped with their rounded sides facing each other and it is suggested that clay may have been used to seal the joins (Ridcut 1996). Such an idea might be supported in fig. 5.31 where wattle is least represented in wall-slots but the amount of daub remains high alongside the loams and silts of decayed wood. Additional strength is gained by the use of a wall-plate supported on particular uprights spaced within the wall. Walls of contiguous timbers are well-documented ethnographically, in particular amongst the Gala, Luyia, Kikuyu, Kuria and the Pokot where the vertical posts are bound together with a few horizontal members. These extra rings also help to redistribute lateral stress (Andersen 1978, 116; 155). Another alternative for the walls of post-built structures – in addition to those suggested above - is the use of non-earthfast, contiguous vertical timbers¹⁵, made increasingly stable by horizontal rings of twisted withes. The more usual circular – as opposed to polygonal - shape of the wall-slot implies that this method might have been more commonly employed in post-built structures, than were prefabricated hurdles, although the use of turf is preferred by the current author.

Daubing

Unless daub is fired through conflagration, or remains in anaerobic conditions, it does not survive. A total of 33 structures had direct evidence for the use of daub. In addition, the identification on excavation of clearly defined, uneroded stakeholes might suggest the protection of a daub wall (Reynolds 1993, 96). When forced around wattle, the fibrous matter in the mix binds the daub to the framework upon drying (*ibid*, 100). With a team of 20, daubing can be achieved in a day (H. Murray pers. comm.). The width of the wall is determined to some extent by the width of the uprights. Daubing inside and out at the first *Glastonbury House* produced a wall 0.23 m thick (Reynolds 1967). The initial application of daub must be smoothed over with wet hands to provide a smooth, weatherproof surface. This then cracks on drying and the cracks are subsequently filled (Reynolds 1979). Daub preparation for a wattle-and-daub wall would leave a considerable hollow adjacent to the structure (Reynolds 1993) and such a feature is rare in north and central Britain. Daub allows the opportunity for impressed

¹⁵ Such an arrangement would limit post-end decay (see 7.3.2) – an important factor in a wall of split timbers – and thus increase structure durability.

decoration, as on the interior walls of the Luo house, or a surface for painting as in the houses of the Bantu and the baKosi (Andersen 1978; Walton 1975; Levin 1971). A thin skin of daub can also be used to plaster over stone walls (Denyer 1978, 97) or the wattle screens used to cover up mass walling.

Mass Walls (fig. 5.34)

Drystone Walling

Foundation trenches are not generally used in the prehistoric construction of stone walls - although examples have been identified at EBA Bodsberry Hill and Lintshie Gutter in Lanarkshire (Terry 1993a; 1995a). At the first *Conderton House*, a circle of turf was excavated to create a shallow foundation trench and the wall stones were laid directly on the truncated topsoil (Reynolds forthcoming, 219). The section of a wall is usually rectangular, or in the case of the first *Conderton House*, virtually square (*ibid*, 222). Most excavators describe their hut-circle walls as 'faced with a rubble core'. Such a description is inaccurate, however, and such a wall would be inherently unstable. In fact, the 'fillings' are laid with much care: each stone is perfectly balanced on two or more stones, working to 'lock in' and brace the facing stones (fig. 5.33a-b). In addition, every third or fourth facing stone - the 'through stones' - projects back into the middle of the wall. The result is a stable, interlocking wall with no internal lateral stresses (Reynolds 1983, 192; forthcoming, 218). During the settling process, each stone shifts to the tightest fit with its neighbours creating increased strength (Brooks 1986). One in seven walls use the technique of orthostat construction - where spaced orthostats are combined with drystone walling (fig. 5.33c). The type predominates in north Wales and the Irish Sea Region and is generally LrIA-RIA in date. Occasionally turf or soil was used in wall construction as suggested at Woolaw and at Porth Dafarch - where beach pebbles were also used - but such a practice does not guarantee long-term stability (*ibid*.).

Ring-Banks

Average mass wall width - the same for both stone walls and ring-banks - is 1.35 m. At c. 0.44 m high, ring-banks are built to roughly half the average height of a stone wall and this is presumably a result of their lesser stability. In African traditional architecture, low stone walls are often used as the foundation for mud walling and in areas of the Upper Niger this 'foundation' might extend to half wall height (Denyer 1978, 93). Clay walls have been argued for at four sites, most notably at LrIA Thorpe Thewles (Heslop 1987) although it is generally believed that mud walling is unsuitable in a temperate climate. Nevertheless, the same technique has a prehistoric counterpart in the use of turf. Turf is an abundant resource and if cut well and stacked skilfully it can provide good shelter. These walls often seem to utilise a wattle screen, usually on their internal face, which acts not only to increase stability but which can also be

daubed. Other methods include the dump construction of an earth and/or stone bank which might again act as the foundation for a turf superstructure or might absorb the thrust of the roof on its own. On slopes, the ground above the rear scarp is often used as the seat of the rafters and the level is made up on the downhill side by a wall or bank of stone and/or turf. A similar technique exists where a scoop is created, the rafters resting on ground level with or without the extra height created by a low wall or bank of stone or turf.

5.3.4 The Entrance

Doorways

The majority of African roundhouses have more than one entrance but this is only certainly the case in forty prehistoric structures (3%). Seven are diametrically opposed but most are between *c.* 23–45° off - perhaps to minimise through draughts across the central fire. A second doorway is generally smaller than the main doorway: *c.* 0.45 m narrower at an average width of 1.21 m. Other entrance features are revealed in stone-walled structures, for example a stone wall often widens slightly - an average of 0.11 m - at the entrance. This presumably has the same effect as providing larger entrance posts in a timber-built structure: compensating for the structurally weak entrance gap. It might also serve to bolster the area most susceptible to the live stresses of human and animal movement. For the same reasons, the entrance is presumably the place of most repair and re-facing activity. One in three stone walls has an entrance gap which is wider externally than it is internally, thereby producing a funnelling effect. The average difference between the two widths is 0.46 m. This might be a feature used to minimise draughts or one concerned with stock control.

The average width of a prehistoric doorway is 1.52 m (fig. 5.35): 1.69 m in timber-built structures and 1.35 m in mass-walled structures. Door width is certainly related to the functional concerns of light and shelter. The narrowest doors are provided on light, south-facing slopes; the widest on sheltered east-facing slopes; and those on west facing slopes strike a compromise between both factors (fig. 5.36).¹⁶ Prehistoric door width is almost double that of the modern doorway. Such a width might be a result of the practice of overwintering livestock: the extra width being necessary to aid stock movement in and out of the structure. It is interesting then that door width increases with structure size (fig. 5.37) although this was presumably also to allow for increased light and ventilation in a larger structure (Hughes & Bezant Lowe 1925). Door width is also seen to decrease with rise in altitude (fig. 5.38) and this may be a result of poorer climate at higher altitudes or perhaps wider doors were utilised only in lowland cattle-raising structures. Threshes were present in 53 prehistoric structures and of these, one in five

¹⁶ The figures for north-facing slopes were unreliable.

were of wood (fig. 5.39c). Threshes like these also help brace the wall terminals. The feature is, however, most common in stone, particularly in the LrIA-RIA North Sea region but also in north Wales (fig. 5.39d). Threshes are generally 0.10-0.20 m wide and raised *c.* 0.10 m presumably to act as a door check and to help minimise draughts.

Postholes at the entrance have a number of different functions: housing posts for the wall terminals, doorframe posts, A-frame supports for a heightened entrance, or door furniture - and some might well combine a number of these roles. Whilst in many structures door furniture is based on a single posthole, slightly more have evidence for the use of double doors (fig. 5.40). Doors are usually positioned internally (fig. 5.41) - based on a central posthole with an average width of 0.40 m (fig. 5.39a) - and were probably made of joined planks or wattle-filled frames. Some features may represent a door pivot housed directly in the ground, paired with another in the lintel. Three in four structures, however, have no evidence for door furniture and in these cases, the lower pivot may have operated in a ground sill (see Reynolds 1993). In some LrIA-RIA stone structures - particularly in north-east England - the upper stone of a rotary quern appears to have been re-used in this role (fig. 5.39d). Rather than functioning as a pivot hole, an entrance feature may have been used as a doorpost onto which a loose door was tied, or was swung, perhaps on leather hinges. The existence of elongated entrance features and double postholes reveal that entrance posts with different functions were sometimes set side by side in the same post-pit (fig. 5.39b). This may be another reason why large features are commonly found at the entrance.

What about doorway height? Does the wall-plate also act as lintel (fig. 5.42a)? This is the case in the high-walled (1.6 m) roundhouses of the Italian campagna (Close-Brooks & Gibson 1966) and is *structurally* the best option as it completes the circle. However, prehistoric walls are lower than this and this option would seriously compromise headroom. The lintel might instead take the form of a purlin above the rafter butts (fig. 5.42b) increasing height at the entrance by as much as 0.20 m (Reynolds forthcoming) making it *c.* 1.03 m in stone-walled structures and *c.* 1.36 m in timber-built structures (see 4.4.2). Such a doorway would require the occupant to stoop slightly upon entering: more so in mass-walled structures. Doorway height is not often recorded in the ethnographic literature but where photographs provide a human scale, we find that it is not uncommon for circular structures to have comparatively low doorways (cf. Denyer 1978; Oliver 1987, 145). The structural advantages of a continuous wall-plate or purlin may outweigh the desire for increased headroom in these examples. Increasing doorway height by breaking the wall-plate weakens the structure and this might again go some way to explaining the use of larger posts at the entrance. The fact that mass-walled structures generally have narrower doorways is evidence for the prehistoric recognition of structural problems at the entrance (fig. 5.35).

Using a purlin as lintel provides some continuity around the circumference – helping the stability of the cone – but only slightly increases height at the entrance. Experimentally, the headroom problem has been tackled by increasing wall height to either side of the entrance (fig. 5.42c) as at the *1982 Castell Henllys House* where the doorposts were made 0.30 m higher than the already 1.6 m high wall (Mytum 1986, 285). In timber-built structures, where evidence was suitable (23 structures), three in four revealed use of this technique: an average increased depth of 0.20 m suggesting an increase of 0.60 m above ground. In order to sustain a 45° pitch at the entrance, however, the remainder of the roof must be pitched a few degrees higher (Reynolds forthcoming, 220). Use of this technique is apparently rare in stone-walled structures although a heightening of the wall was identified at Lairg CS 3 (McCullagh & Tipping 1998). Rebuilding the collapsed Conderton wall revealed a consistent wall height of 0.80 m. Nevertheless, the height of the wall next to the entrance was raised to 1.50 m in reconstruction, despite the lack of archaeological evidence in favour of such a decision.

An alternative solution would be the construction of an A-frame at the doorway (fig. 5.42d). The resulting ridge-piece, however, requires additional support at a slight distance from the doorway. This is easily achieved in mass-walled structures with an A-frame supported at either end of the doorway – the average distance between the two being 1.57 m. In timber-walled structures the arrangement is more complex. An internal post centred on the doorway is uncommon archaeologically – presumably because it would restrict access. If a ridge-piece were extended from the ring-beam, the resulting A-frame – in an 8 m structure – would be c. 3 m high and angled at an impractical c. 75°. The result is either the use of a second A-frame internally, suspended from a beam between the first and last posts of an internal post-ring; or on an external A-frame supported on an additional pair of posts: thus creating a porch. It is suggested that both techniques would be commonly used. An A-frame pitched at 50° on the average door width would increase doorway height in timber-built structures from 1.36 m – including 0.20 m for wall-plate and rafter butts – to 1.8 m; and from 1.03 m – at 45° – to 1.65 m in stone-walled structures. Few simple-ring structures have evidence for an internal pair of postholes set back from the doorway although where two pairs of postholes frame a stone wall or ring-bank – such as at Woolaw (fig. 5.39c) and Moel y Gacwr (fig. 5.49) – such an arrangement is likely. The use of an A-frame is perhaps most common then in mass-walled structures – with their restricted wall-height – and in larger timber-built structures. The latter confirmed by the greater provision of porches in these structures (see below).

Porches

Of 527 timber-built structures, only one in three had some evidence for a porch and only half of these were definitive¹⁷. The provision of a porch is apparently related to structure size (fig. 5.43). Whilst one in six of those with definitive evidence consist only of a simple pair of posts, one in five are rather elaborate: with six posts providing an average length of 2.56 m (fig. 5.44). It has been suggested that, in structural terms, the porch must be separate from the cone-and-cylinder (Avery & Close-Brooks 1969; Hill 1984). This was proved in reconstruction. The porch of the *Balksbury House* was built as part of the main structure and when the low-pitched porch roof became saturated and heavy the structure was unable to cope and failed after just three years (Reynolds 1979, 41; 1988, 13). Avery & Close-Brooks (1969) assertion is also proved archaeologically, as where axial-line symmetry exists, the porch is not always on the same trajectory, implying not only that it was structurally unimportant but that it was constructed after the cone and cylinder (Guilbert 1983, 78). At Bannockburn Fort CS 1, for example, the porch slot was apparently cut in a separate, later operation from the wall slot (Ridcut 1996).

It is traditionally assumed that the role of a porch is to provide shelter (Harding 1974; Cunliffe 1974). Whilst this may be contradicted by the fact that door width is exactly the same in those structures with and without a porch it is perhaps supported by the fact that porches are exceedingly uncommon in traditional African architecture, where the better climate would make them unnecessary. In addition, porches are provided most commonly in those structures on the upper slopes (fig. 5.45). However larger, low-lying structures also frequently utilise the porch – proportionately more so on structures in excess of 16 m – and it is suggested that this reveals the more important role of the porch: a way of increasing light (contra Reid 1993, 23). This is supported by the fact that porches are most commonly provided on north-east and north-west facing slopes and on north-facing structures (fig. 5.46). Whilst it is assumed that the A-frame was thatched, it is possible that beneath this, the porch was open. Few reveal evidence for uprights between the posts. The postholes, often so-readily interpreted as a protective porch, are in fact a simple design solution using A-frames to maximise light and headroom at the entrance (see above). As a result, the porch first envisaged by Brewster (1963) is supported here (fig. 5.47).

The 'porch' as a grand dominating feature is seen as a by-product of the size = status mindset of Bersu's generation (cf. Chadwick Hawkes 1994, 66). It is suggested that our large Wessex roundhouses have actually been misinterpreted (see 4.2.4) and that the features traditionally seen as a porch for the house are actually those of a porched 'gateway' separate from the

¹⁷ Even this figure is an over-estimation as it includes 'porches' which might now be re-interpreted.

structure (fig. 4.6). It is also suggested that some other apparently porched structures have also been misinterpreted. At Moel y Gaer, for example, if we accept the structures as turf-walled ring-bank structures with internal wattle-lining (see 4.2.3) we find that the 'porch' postholes are instead more likely to be doorframe posts flanking both ends of a turf wall, perhaps supporting A-frames over the doorway (fig. 4.11-4.12). In light of this, it is very interesting that the average depth of a porch (1.61 m) is very similar to the average depth of a stone wall at the entrance (1.57 m). Similarly, the dimensions of porch postholes are very similar to those of doorframe postholes (fig. 5.48). At some, the porch might still be seen as part of an elaborate entranceway feature and a similar conclusion has been reached by Dunwell (pers. comm.) in his interpretation of CS 1 at Dryburn Bridge which he describes as a post-built double-ring with an 'elaborate façade structure'.

Constructing a monumental porch at the *Pimperne House* created a 2.43 m high door. The door was found to be impractical and greater use was made of the smaller side doors (Reynolds 1993, 97-98). The high porch of the *LDCD House* has also proved problematic. The porch roof blew off in autumn 2000 and this failure led to a section of the wall-plate breaking away, forcing the adjacent posts to tilt inwards at a 10° angle, causing slump and displacing around one-fifth of the post-ring (R. Hodge pers. comm.). The largely theoretical concept of the monumental porch has led to reconstructions where not only is an A-frame provided but where wall height is also increased at the entrance. However, providing an A-frame alone is enough to increase both headroom and light without compromising durability. Building on traditional interpretations, large entrance postholes have most recently been taken as evidence for the symbolic role of a monumental entrance in display activities (Brück 1999b). Similarly, ritual narratives have been constructed which see monumental entrances as symbolically emphasising the liminal space of the orientation-defining threshold (Fitzpatrick 1994; 1997; Hill 1996).

If, however, we dispense with the size = status model and return to a more grounded interpretation of the archaeological features, we find that there are a number of practical reasons why enlarged post-pits are found at the entrance to a roundhouse. Structurally, large posts may be used to help compensate – during construction – for the weakness created by the entrance gap: the large posts providing a dead weight counterthrust to the live thrust of the roof. Large posts might also be used to counter the live stresses of human and animal movement at the entranceway. Taller posts might be used to increase height at the doorway and a taller post needs a deeper (and thus wider) posthole. Large posts are also needed to support the separate rectangular structure of a thatched A-frame porch. Alternatively, two posts with different functions – e.g. a porch post and a doorpost – may be sunk together in the same post-pit. In addition, entrance posts are less protected from the weather, and at the *Pimperne House* porch posts had to be replaced after just eight years, the resulting maintenance activities led to the

creation of enlarged postholes (Reynolds 1993). This is supported in the evidence from post-pipes which reveal that in entrance features the post-pipes are similar in size to those from other types of feature, whilst the posthole in which they are set is very much larger (fig. 5.50).

5.3.5 Thatching

The majority of ethnographic walled structures have a thatched roof (Denyer 1978, 95) and the weight of the archaeological evidence suggests that this was the norm in prehistory. Thatching provides the opportunity to even out any dips in the line of the roof frame and this can be achieved by packing hollows with extra thatch or by attaching additional, tailored wattlework frames (Reynolds 1993, 100; R. Hedge pers. comm.). Reynolds maintained that 'ring thatching' must be carried out from eaves to apex so as to keep weight distribution even. This is not necessarily the case, however, and the thatcher who recently re-thatched the *LDCD House* used 'sector thatching' from top to bottom. This type of thatching, however, requires scaffolding – which incidentally utilised the upper ring-beam – in order to maintain roof shape (Roger Hedge pers. comm.). Ethnographically, the Gurage of central Ethiopia thatch in a spiral and the use of stepped thatch is also well documented (Gebremedhin 1971; Andersen 1978; Denyer 1978). In a temperate climate, however, these techniques would suffer badly from wind damage. Providing a smooth finish to thatch presents the weather with less opportunity for damage (Reynolds forthcoming).

When straw is used for thatch a layer of underthatch is laid first to provide support for the pegging of the straw. At the first *Conderton House*, a thick layer of hay was meshed into the withes of the roof frame (Reynolds 1983, 196; forthcoming, 223). Horizontal sways or binders are used to secure the underthatch to the rafters and laths (fig. 5.51). The thatch is then laid in bundles – ideally to a depth of 0.30 m (English Heritage 2000b) – and given a smooth profile: reed is beaten up with a tool known as a leggat and straw is raked. The thatch is held in place by horizontal rings called runners (also known as liggers or battens) which are secured with spars, or broches. Reynolds used split, twisted hazel and willow rod spars at his first *Conderton House* which sprung apart to hold the runners in place (Reynolds forthcoming, 223). As with tying materials, spars can be stored dry and soaked prior to use (Tabor 1994, 97). At the second *Conderton House*, the thatch was *sewn* in place using sisal twine (Reynolds forthcoming, 227). The *Pimperne* thatch still suffered from wind damage despite the use of runners and this probably implies the use of cross rods (fig. 5.52). These can be decorative as well as functional. In addition, a circular net – as used at the *Greenbogs House* – might help to keep thatch in place. In the highlands of South Africa the thatch is covered with overlapping grass mats (Biermann 1971, 101-104). Thatch weights are a further possibility but evidence for stone examples is rare.

Kilbride-Jones (1938) was the first to envisage a gap being left at the apex for the provision of light and ventilation. Hansen left such a gap in his experimental reconstruction but found that when the door was open smoke swirled about creating an unpleasant atmosphere within the house (Hansen 1959, 52). This idea was still accepted by Brewster (1963) at Staple Howe but was firmly disputed by Gardner & Savory (1964) not least because of the central position of the prehistoric hearth. In addition, Reynolds (1983) commented that a hole at the apex would create a 'blast furnace effect': the thermal spiral from the fire would be accelerated and with an appreciable draught sparks would reach roof height causing a conflagration event. Rather, a suspended pole may be provided at the apex as a means of tying the top layer of thatch, as in the traditional Kipsigis house (Oliver 1987, 65). In traditional African communities, the apex is often covered with a woven (often decorative) finial or an upturned pot (Denyer 1978, 117). In the Luyia house the thatch at the apex is held in position with a coil of reeds and sticks (Andersen 1978, 155). In modern Italian shepherds' huts a 'neat straw cone' finial is provided (Close-Brooks & Gibson 1966).

In timber structures, the rafters extend beyond the wall to create *eaves* which protect the wall from the weather and at the door the bottom layer of thatch can be forced up by fixing a board at a right angle to the rafters (Fearn 1976, 9). In stone-walled structures, however, the thick wall – needed structurally – means that providing overhanging eaves is not so straight forward. At the first *Conderton House*, tying the rafters to the wall-plate left a 0.5 m wide area of wall top exposed to the elements. Bundles of straw were laid on the wall top to create an eave capable of protecting the wall from frost action (Reynolds 1983, 196). This is the more usual *Skye Type* of thatching used in highland crofts. In the *Hebridean Type* – which is also a west Wales tradition – flat stones are angled across the wall top to throw off the worst of the rainwater (Sinclair 1953). The latter requires 15% less thatch than the former and was used for the second *Conderton House* (Reynolds forthcoming, 223; 227). This structure was, however, declared unsafe in the year 2000: rainwater running into the walls meant that the structure was very damp and whilst the roof itself did not leak it was removed after just eight years (D. Price pers. comm.).

5.4 Discussion

The idea of the wattle wall can be refuted for the majority of timber-built structures in northern and central Britain and it is suggested that most instead were of contiguous timbers. The use of daub on sites without clay geology is seriously questioned. As a result, the practice of coppicing for wood, whilst still important, is not as all-consuming as Reynolds' work might suggest. Still, the need for withes as tying materials and for fencing etc. would mean that wood coppice probably existed alongside trees for timber in areas of managed woodland. It is suggested that draw-felling for house construction would not make a great impact on the pollen record. In

addition, managed woodland currently has the same signal as unmanaged woodland and as such remains invisible (R. Tipping pers. comm.). Higher resolution diagrams, however, have for the first time revealed evidence for coppicing in the late Iron Age of the Southern Uplands (Tipping 1997). Reed would be preferable to straw as a thatching material and we can assume that reed beds were also a managed resource in prehistory. Turf is an unlikely roofing material in a temperate climate and its use is not borne up by the archaeological evidence; its use as walling is, however, more common than traditionally believed. The predominant material used in prehistoric house construction was timber. This was split when green, maintaining its bark, and was seasoned for perhaps 18 months. Oak was the material of choice but was unavailable in the north and west where birch, alder and the ring-bank was used.

Evidence from tools, suggests that coppicing and felling techniques improved in the LrIA as a result of the ubiquity of iron but that in some areas stone axes continued in use throughout. The evidence suggests an increase in skilled carpentry during the later 1st millennium BC, as well as the practice in some areas of squaring timber which it had been thought was a distinctly Roman technique (contra Scott 1976, 38). If the distribution of forestry and construction tools and also of whetstones reveals woodland management activities, then these would appear to be taking place predominantly in the large upland enclosures of Tyne-Forth and North Wales during the Iron Age and RIA. One in four sites with whetstones are RIA recti-linear enclosures, predominantly in north-east England. The LrIA-RIA circular homesteads of Perthshire are also represented by Alclune 2 and Queen's View, as are unenclosed hut-circles of all periods. Stone is considered to be a 'second best' material. Stone structures are harder to build: Reynolds (forthcoming) suggests that in contrast to a stone-built structure, a post-and-wattle structure is a 'minor undertaking'. The use of stone also limits the potential size of the structure. Stone walled structures are used more frequently during the LrIA-RIA period, following the major late Iron Age woodland clearance of c. 500-0 BC (R. Tipping pers. comm.). It is at this time that woodland management also becomes more visible in the archaeological record.

The majority of prehistoric settlements in north and central Britain are located on hillslopes, generally the lower slopes, presumably to maximise the resource potential of the surrounding landscape. Table 5.9 reveals the characteristics of the main structure types. Figs 5.53-5.54 reveal changes in landscape location through time. Valley locations are most popular during the LrNeo. Low-lying areas become popular at around 2000 BC with upper slopes utilised most between c. 2500-1500 BC. The use of low summits and ridge locations begins in the EBA with use of higher ground taking off in the MBA after which time it falls off again. Lower slopes are relatively popular in the 2nd millennium BC but this falls off at c. 800 BC. The use of low-lying areas, however, rises dramatically at c. 800 BC and, at the same time, a dramatic peak is seen in summit locations. The latter falls off in the EIA, whilst low-lying settlement remains popular.

Lower slopes become increasingly utilised again throughout the Iron Age following their decline at *c.* 800 BC. Valley locations are utilised again at *c.* 400 BC - the first time since the LrNeo – whilst the use of higher ground reaches a new peak during the LrIA to fall off again at *c.* AD 50. Use of summit and ridge locations grows steadily throughout the LrIA and RIA periods.

	Main Dwellings (& Seasonal)			Seasonal
	Contiguous Timbers	Stone Wall	Post-Built	Ring-Bank
Main Siting	various	> 100 m	< 200 m	> 200 m
Mean Diameter	8.8 m	7.6 m	8 m	7.9 m
Wall Width	0.30 m	1.35 m	1.35 m	1.35 m
Wall Height	1.16 m	0.83 m	1.16 m	?0.83 m
Doorway Height	1.36 m	1.65 m	1.65 m	?1.65 m
Doorway Width	1.69 m	1.35 m	1.69 m	1.35 m
Roof Pitch	50°	45°	50°	45°

Table 5.9 Main structure types in north and central Britain

The move towards higher ground in the MBA is accompanied by the origins of enclosure (figs 5.55, 5.57). Settlement within elaborate enclosures may have LtBA origins at the Breiddin, Eildon Hill North, and Moel y Gaer. EIA elaborate enclosures tend to be in the west, for example at South Barrule (Isle of Man), Old Oswestry (Shropshire), and Woodend Farm (Dumfries & Galloway). Elaborate enclosures peak at *c.* 400 BC after which time they decline in number. Unenclosed settlement remains at the 50% level from *c.* 1500-400 BC at which point it falls to a constant *c.* 15%. Regionally, elaborate enclosure is most popular in north Wales, the Irish Sea and North Sea regions (fig. 5.56). Elaborate enclosure is least popular in Highland Scotland and the Yorkshire Pennines; the former preferring unenclosed settlement, the latter simple enclosure forms. This ties in well with the evidence from figs 5.58-5.59 which reveal regional variation in landscape location. Whilst height above sea level is generally related to regional topography, higher ground is rarely utilised in Highland Scotland. Valley locations are most popular in the north; summit locations in the west; and both summits and ridges are popular in Tyne-Forth. Platforms are, in general, used much more extensively in the 2nd millennium BC than in the 1st – their low numbers in the EBA, however, can not be explained except perhaps in the careful siting of structures on very gentle slopes (fig. 5.60). If the use of a platform reveals a need to create level ground because of an inability to tailor materials to the slope; perhaps the decline in use of the platform beginning at around *c.* 1000 BC reveals the advent of an increased control over the lengths of timber used: as identified at LBA-EIA Swarkestone Lowes. There is a very slight rise in the use of platforms again peaking at around 400 BC.

Generally, the choice of slope serves to maximise shelter and light but is also concerned with facing sunrise and sunset. This might be used to argue for sun worship, however the wider model for prehistoric sun worship is considered unreliable and a more phenomenological

interpretation is preferred here. Chronologically, north-facing slopes are reasonably popular throughout and this is presumably skewed by its preference in the North Sea Region (table 5.10). West is particularly popular until the mid 2nd millennium BC when there is a shift towards east and then north-east by the LBA when there is also an increase in variability. South is most popular during the early 1st millennium BC shifting to north in the later 1st millennium BC, accompanied by an increase in variability, and south is again popular during the RIA. The shift from west to east at c. 1500 BC and from north-east to south at c. 800 BC are perhaps the clearest trends in the data. The variability in slope during the LBA and the LrIA through to the RIA are also marked. Regionally, the picture is quite complex (table 5.10) but generally, south and east slopes are most popular in the north - maximising light and shelter from the strong westerlies (cf. Oswald 1991). North slopes are preferred in the east - away from the southerly winds (*ibid*). East and west (facing sunrise and sunset) are preferred further south, particularly in the Midland Plain but also in Yorkshire, with west and south popular in north Wales – facing into the strong winds but also the sea and the sunset (*ibid*). The impact of local topography is, of course, paramount here but is unquantifiable at this level of analysis.

After an early preference for NE and SW orientation in the milder climate of the 2nd millennium BC, enclosures reveal an increasing concern with an east or south-east orientation (sunrise on the equinoxes and at midwinter) between c. 800-400 BC and this becomes increasingly standardised at between 40-50% (fig. 5.61). In the LrIA, orientation of enclosures is increasingly variable, perhaps revealing display in the landscape to be more important than siting for functional or ritual concerns. At c. 50 AD there is a return to the south-east with east dominant in the RIA. Enclosure orientation varies significantly between regions but all seem to share a preference for a particular point of sunrise – although these do not exceed c. 30% of the dataset in any region (fig. 5.62). It is suggested that the predominantly east to south-east direction of structure orientation is concerned with the provision of light, shelter and morning sunlight. The provision of light is particularly dependent on structure orientation, as the door is the main source of light within the structure. A south-easterly orientation provides maximum light in the winter when days are short. Variation between ENE and SSE may be accounted for by use of seasonal structures.

Following an early variability in structure orientation, an increased concern with the functional optimum is seen during the MBA (fig. 5.63). At c. 800 BC structure orientation sees standardisation to an unparalleled level in prehistory when 52% of structures face south-east. This eases during the EIA but the functional optimum is still respected. Summer sunrise becomes popular at c. 400 BC, after which orientation is broadly focused around east throughout the LrIA and RIA periods. Regionally, a more southerly direction is favoured in the north whilst east is preferred further south (fig. 5.64). This is a result of differences in latitude

with areas in the north having fewer daylight hours in winter than their southern counterparts. As a result, an increasingly southern orientation in the north has the effect of maximising what daylight there is. In the south - where longer days means there is greater scope for orientation - the prevalence of east-facing houses perhaps reveals a preference for sunlight. So, where communities are unfettered by strict functionalist demands they choose to face sunrise.

Evidence for the provision of foundation deposits is relatively rare: potentially present in less than fifty structures (4%). The practice may have Bronze Age origins. The placing of quernstone fragments as packing in structural features is first seen in Highland Scotland during the EBA and the practice continues - predominantly in Scotland and northern England - throughout the LrIA. Another LrIA tradition appears to be the ritual deposition of a tool used in construction: an adze with broken haft in a pit at LrIA South Shields, a stone axe in a pit at LrIA Ballacagen Lough B, and an iron reaping hook - perhaps used for gathering reed thatch - in the wall at the LrIA-RIA Dod CS AVI Pd.IV. Using querns as packing tails off in the RIA as a result of the LrIA change in predominant house type from timber-built to stone-built. Domestic ritual traditions adapt, however, and quernstones are instead built into the house wall. This practice is slightly more popular in the North Sea region (although the dataset is biased towards this region). Potsherds are also found within walls but it is perhaps more difficult, at this stage, to argue that their inclusion is non-normative. At some sites, artefacts reminiscent of querns are found in the wall, at others prestige metalwork. These practices do not seem to be regionally specific although an early predecessor may exist at MBA Bracken Rigg (Durham) where a jet pendant was found in the wall.

The best time for construction is in midsummer when the animals are out to pasture, prior to the onset of the harvest. Materials were probably stored for up to 18 months prior to construction. It is further suggested that a whole community - otherwise dispersed in the landscape - comes together for the social event that is house construction and the process acts as an arena for the passing on of the skills and traditions of house-building to the younger generations. The whole process would take place over perhaps a week during which time stored materials were transported, additional ones assembled, the site was made ready, and materials prepared in the lead up to construction itself, which was probably completed in a day. Reynolds' developed construction sequence - where a wall-plate and main ring-beam act as raised props for principal rafters resting on the ground - is supported here. However prefabrication of the roof is a possibility in some smaller structures and in stake-walled structures the wall-plate was non-supportive during construction - an alternative sequence has been offered. Structures in excess of 5 m in diameter would have required ladders or temporary scaffolding for construction of the main ring-beam. Following construction, the structure is self-supporting and the internal post-ring and wall-frame are redundant in structural terms.

Chronologically, door width narrows dramatically at *c.* 2000 BC, increasing again in the LBA and the LrIA (fig. 5.65). Regionally, structures in the west have narrower doors than those in the east (fig. 5.66). There is much variation in wall height with higher stone walls most popular at *c.* 800 BC and during the LrIA-RIA (fig. 5.67), particularly in the stone-rich west (fig. 5.68). The traditional idea that larger structures had taller walls has been questioned. Average prehistoric wall height – following the addition of a wall-plate – is 0.93 m in mass-walled structures and 1.26 m in timber-built structures. The ideal roof pitch for each is 45° and 50-53° respectively. The optimum roof pitch is considered to be 50°. The traditional idea that larger structures had a lower roof pitch is now questioned. Headroom at the periphery is not seriously compromised; with average modern male height (1.80 m) being achieved at just 0.4 m from the wall in timber-built structures and at 0.85 m in mass-walled structures. In mass-walled structures adequate headroom (an average of *c.* 1.65 m) is provided at the doorway by an A-frame supported across the entrance at each end of the wall. In timber-built structures a raised lintel was often provided; increasing headroom – from the 1.36 m headroom provided by a purlin lintel – to *c.* 1.96 m. In larger timber-built structures, an A-frame was provided at the doorway; its pair housed either between the posts of the internal post-ring or in front of the doorway, to create a simple porch.

Less than one in five timber-built structures had a porch and the real figure may be much lower than this. Due to a lack of structural understanding, the prehistoric porch has suffered from a process of aggrandisement over the last sixty years in roundhouse studies. As a result, entrance features and thus houses have been seriously misinterpreted at some sites and experimental reconstructions have failed. Recent ideas regarding monumentalised entranceways as evidence for display and ritual practice must now be re-evaluated. Whilst some porch structures may have been used to provide shelter at the entranceway this was not the role of the structure more generally and porches, whilst thatched, were usually not walled. The evidence suggests that porch structures were used not only to increase headroom at the doorway but also to enhance the provision of light. The porch was created as a design concept at around 2000 BC after which time it grew in popularity, reaching a peak in the MBA (fig. 5.69). At the end of the 2nd millennium BC fewer structures were provided with porch structures and this was generally the case in the 1st millennium BC with a brief rise in popularity again during the EIA and RIA. Elaborate porches were an early feature but were lost as a type during later 2nd millennium to be re-invented at *c.* 800 BC; reaching a floruit at *c.* 400 BC. Short porches were popular until *c.* 1000 BC but were also lost, re-surfacing again as a minor type during the EIA (fig. 5.70). The provision of a porch is not region-specific although they are slightly less popular in the Midland Plain (fig. 5.71). Short porches are popular in the North Sea Region whilst elaborate porches are most popular in Highland Scotland and North Wales (fig. 5.72).

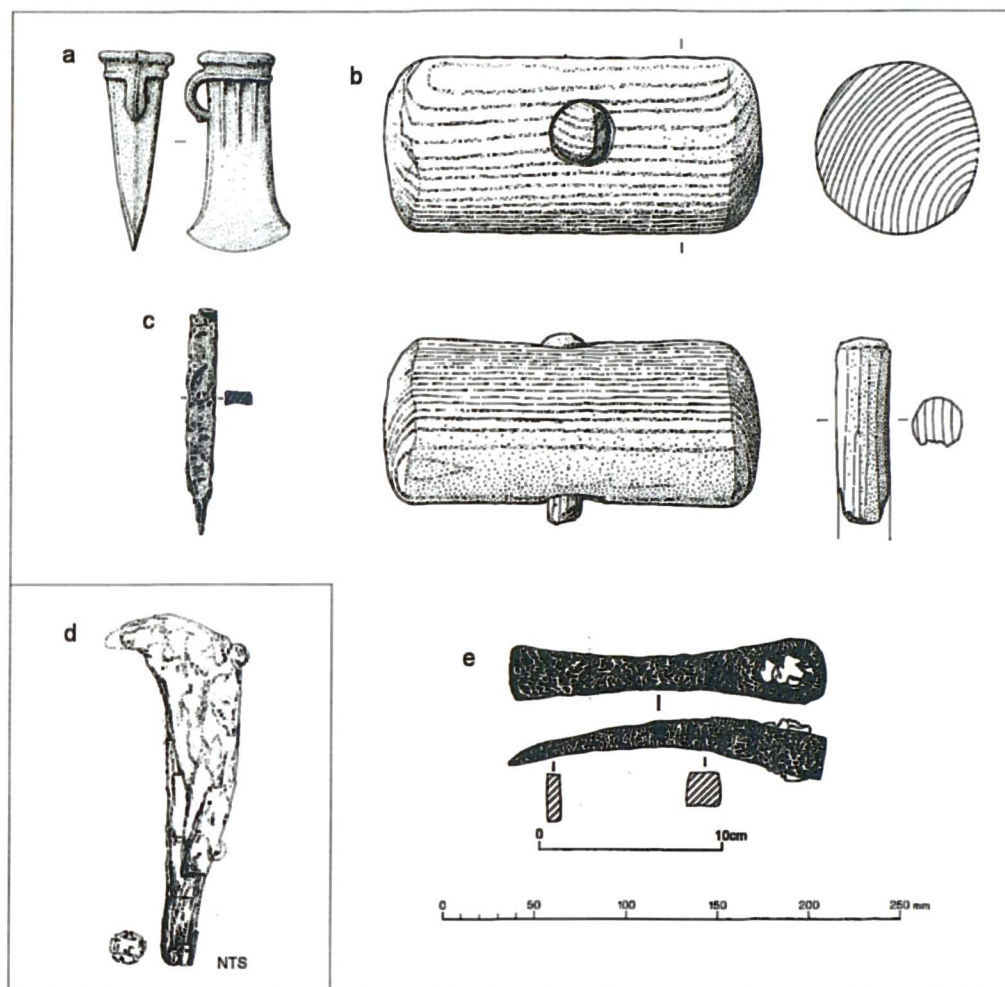


Fig 5.1 Forestry and construction tools from north and central Britain: a) bronze axe (Breiddin); b) wooden mallett (Breiddin); c) iron chisel (Dinorben); d) iron billhook (Tre'r Ceiri); e) iron adze (South Shields)

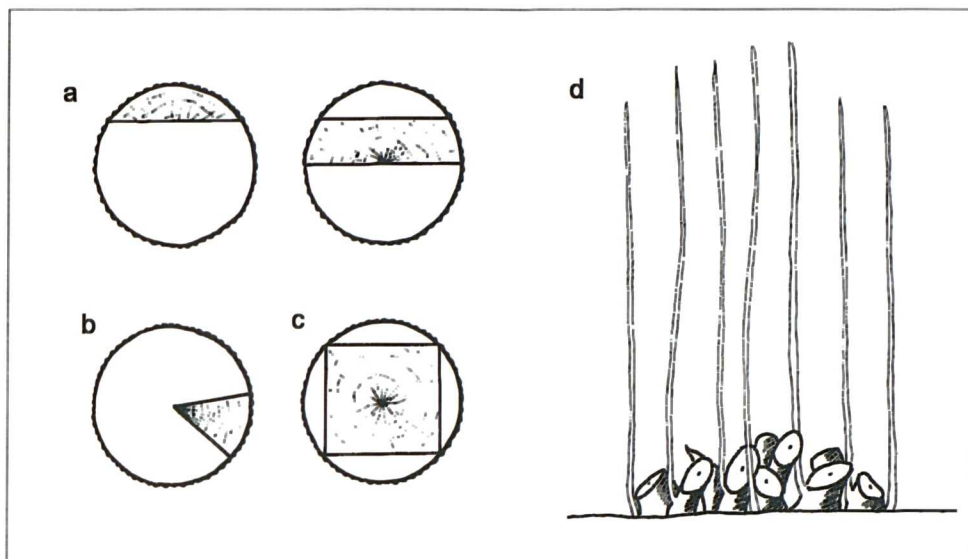


Fig 5.2 Timber and wood: a) tangentially split timber; b) radially split timber; c) squared timber; d) coppice stool (after Taylor 1981; Tabor 1994)

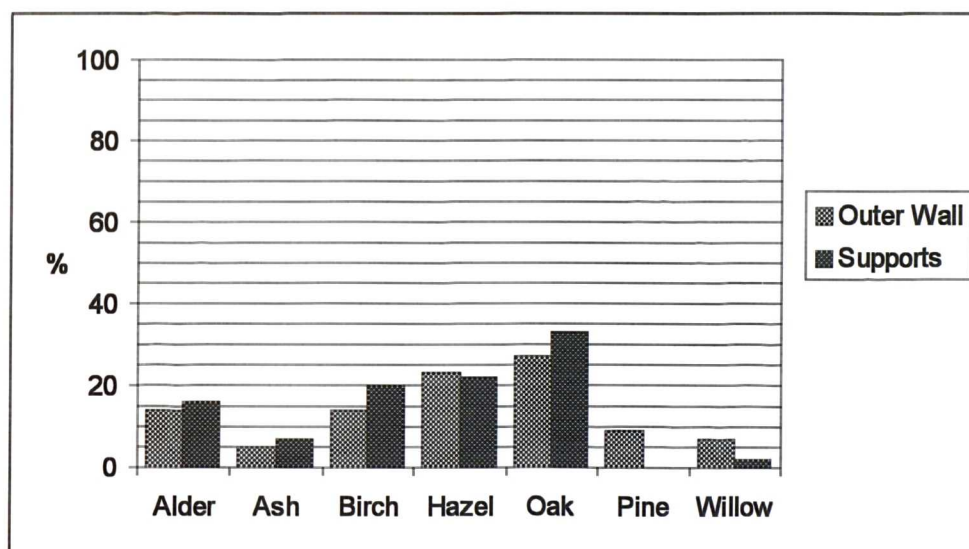


Fig 5.3 Wood type in structural features

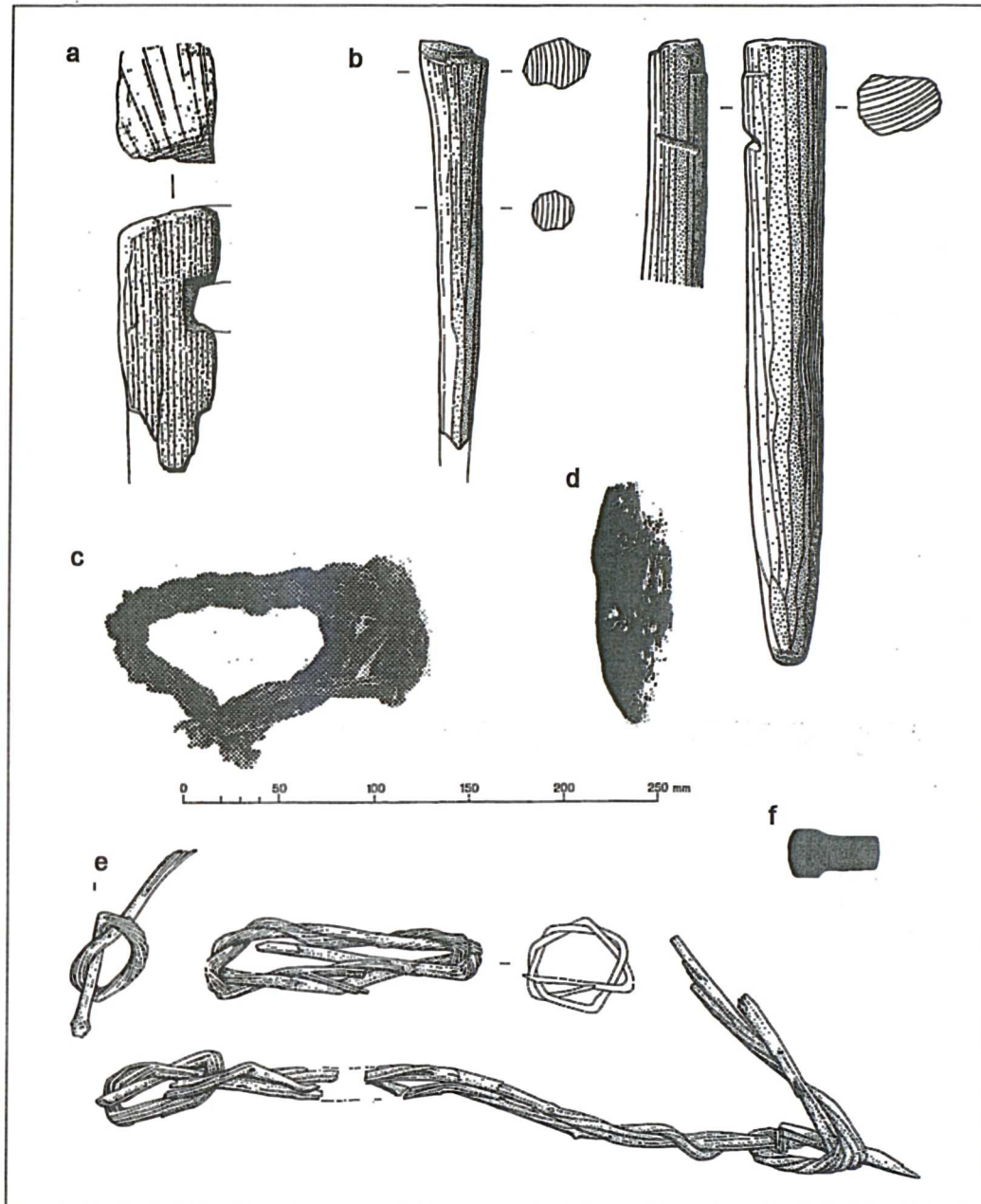


Fig 5.4 Joinery and ties from north and central Britain: a) mortice hole in squared timber (Breiddin); b) oak pegs (Breiddin); c) wither rope (Collfryn); d) willow peg (Long Knowe); e) wither ties (Breiddin); f) hazel peg (Fisherwick)

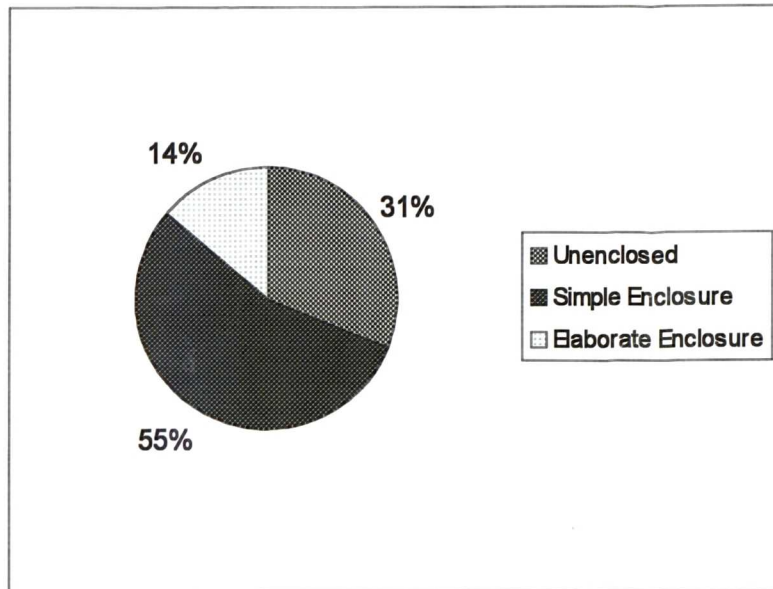


Fig 5.5 Circular structures and settlement type

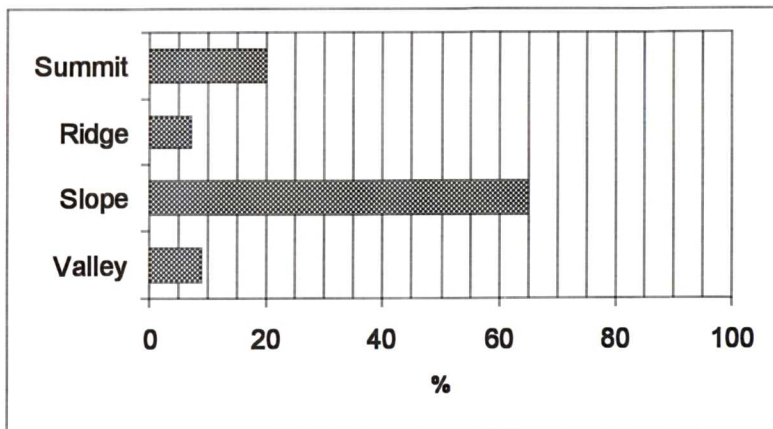


Fig 5.6 Location of circular structures in landscape

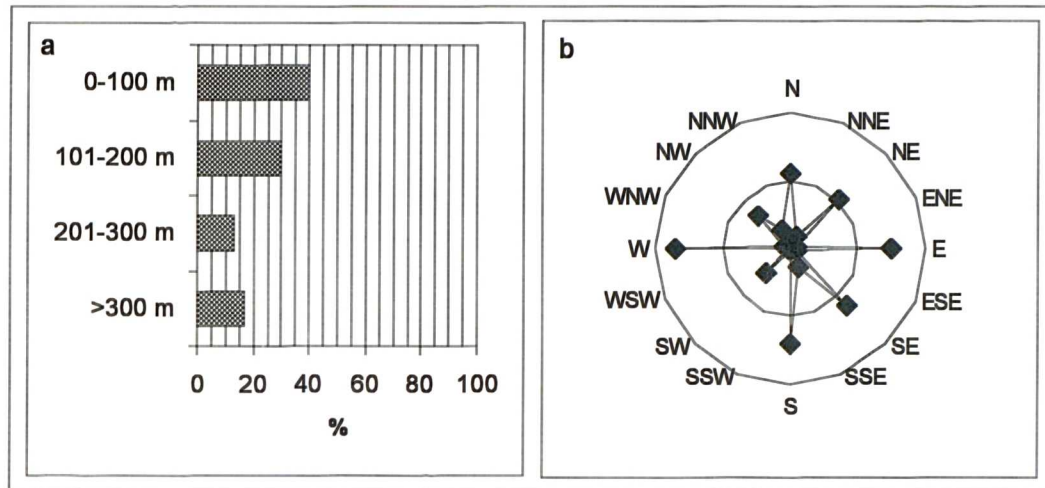


Fig 5.7 Structure location: a) height above sea level; b) slope orientation

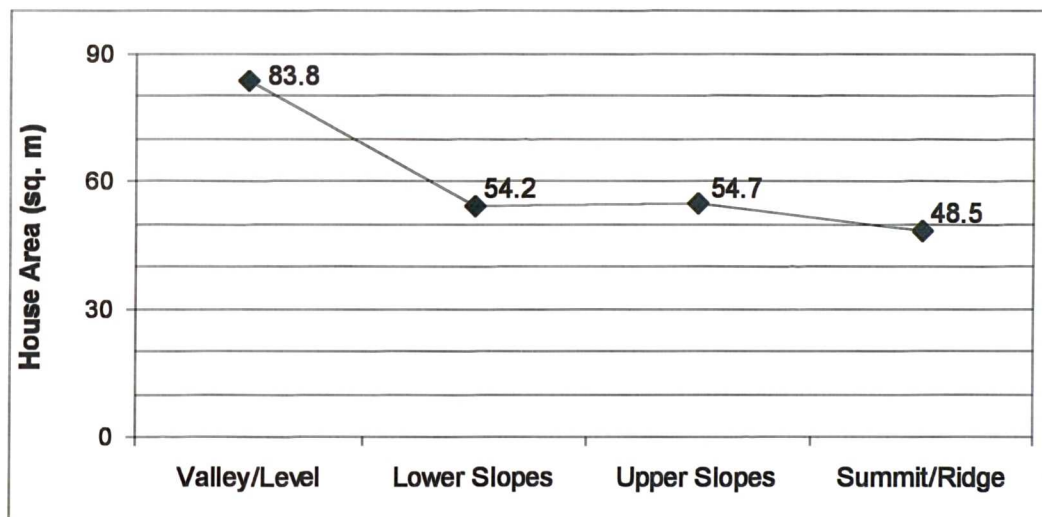


Fig 5.8 House size and landscape location

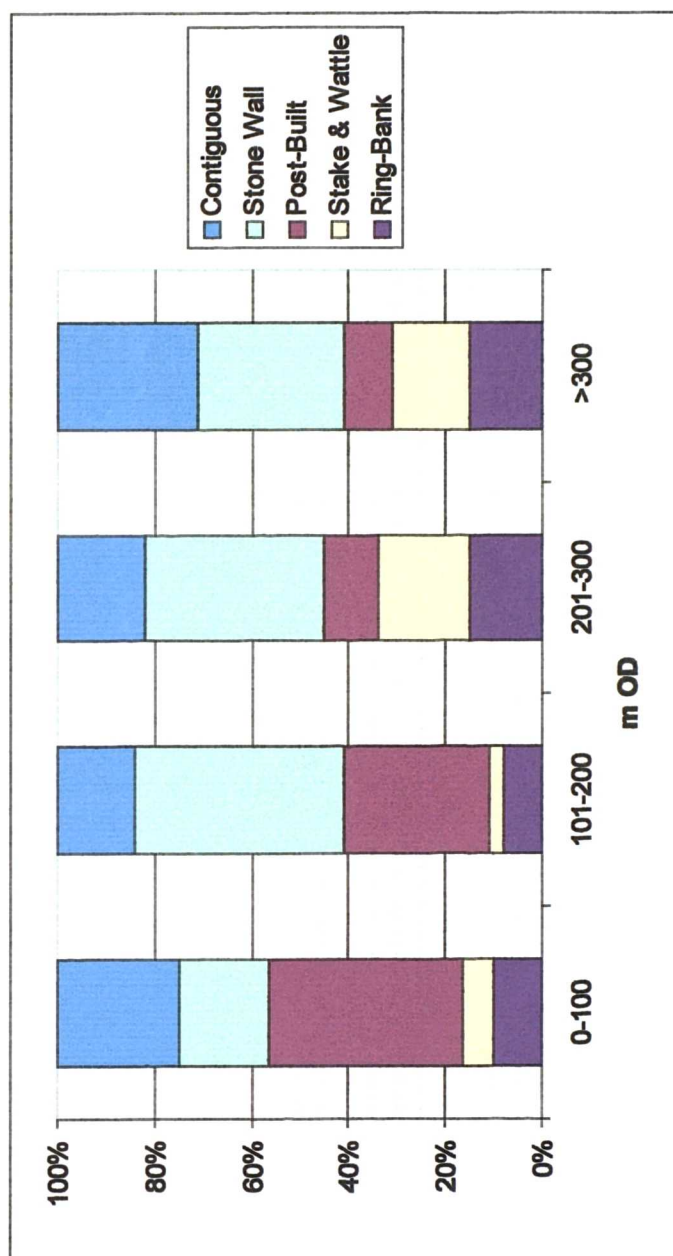


Fig 5.9 Height above sea level and wall type

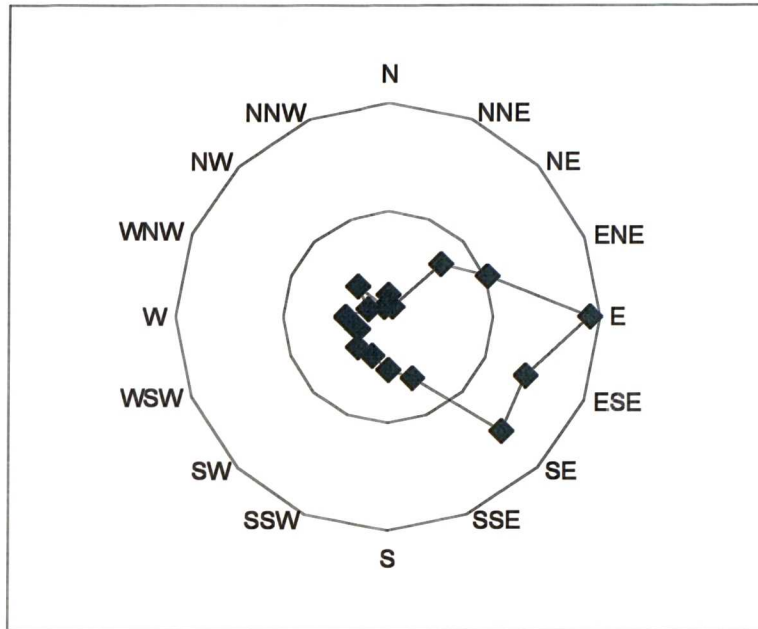


Fig 5.10 The orientation of 800 circular structures in north and central Britain

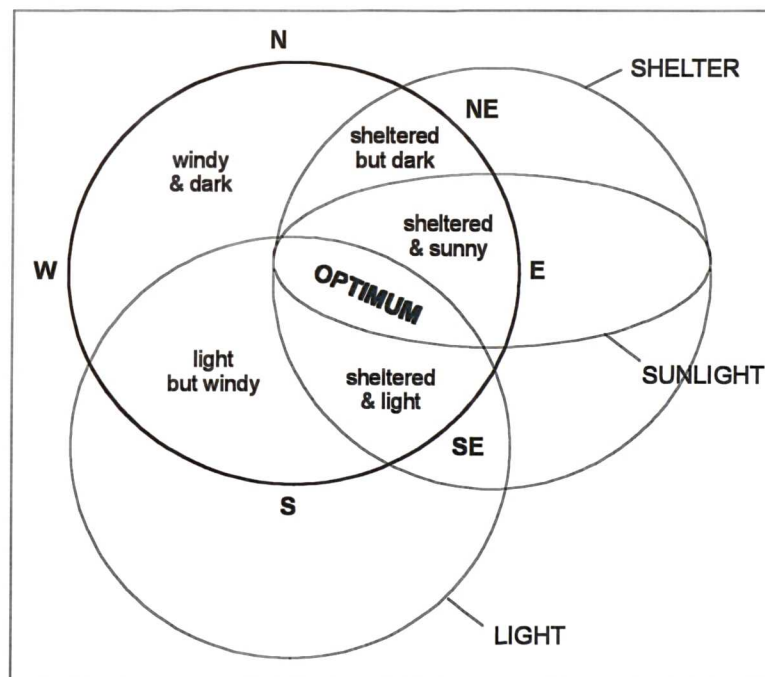


Fig 5.11 The 'functional optimum' for structure orientation

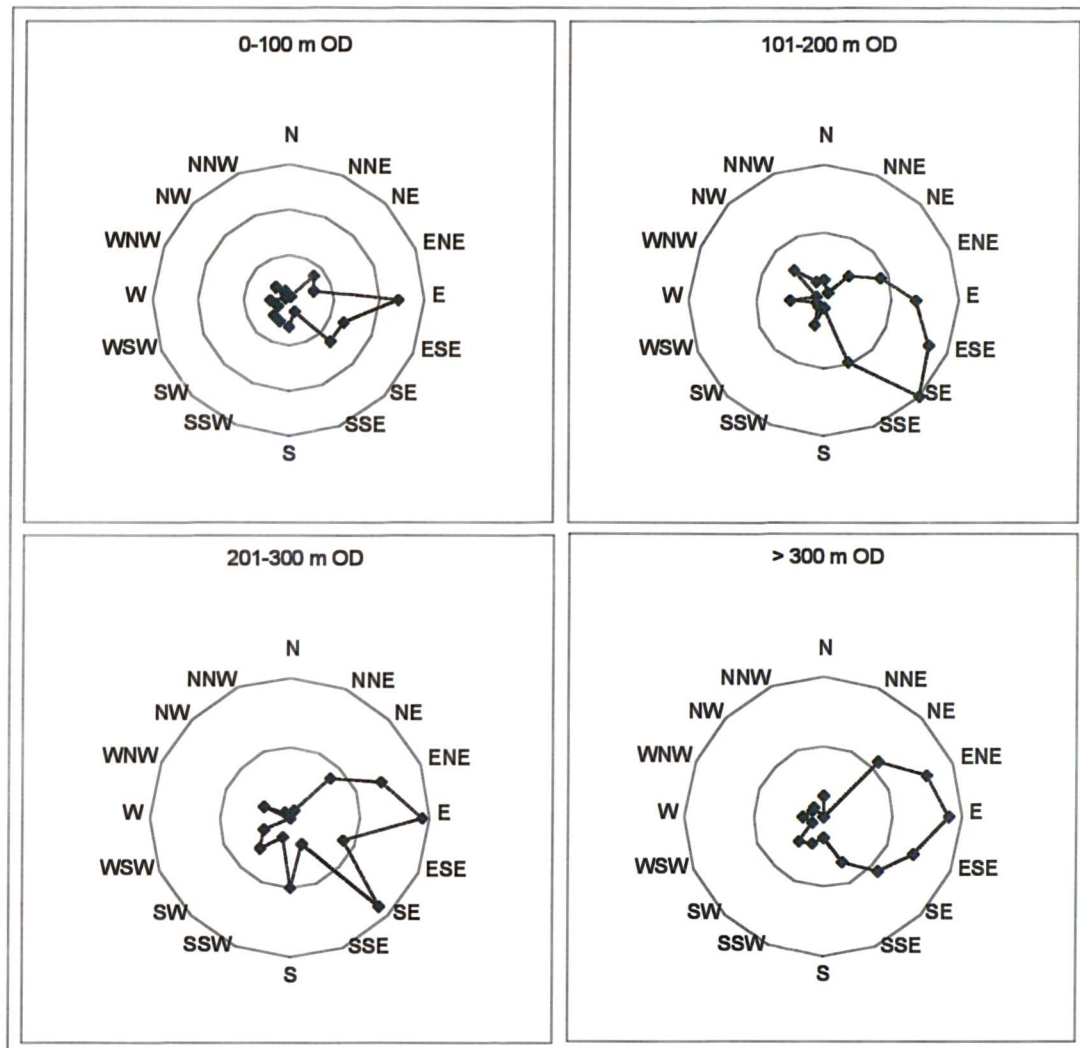


Fig 5.13 Structure orientation and height above sea level

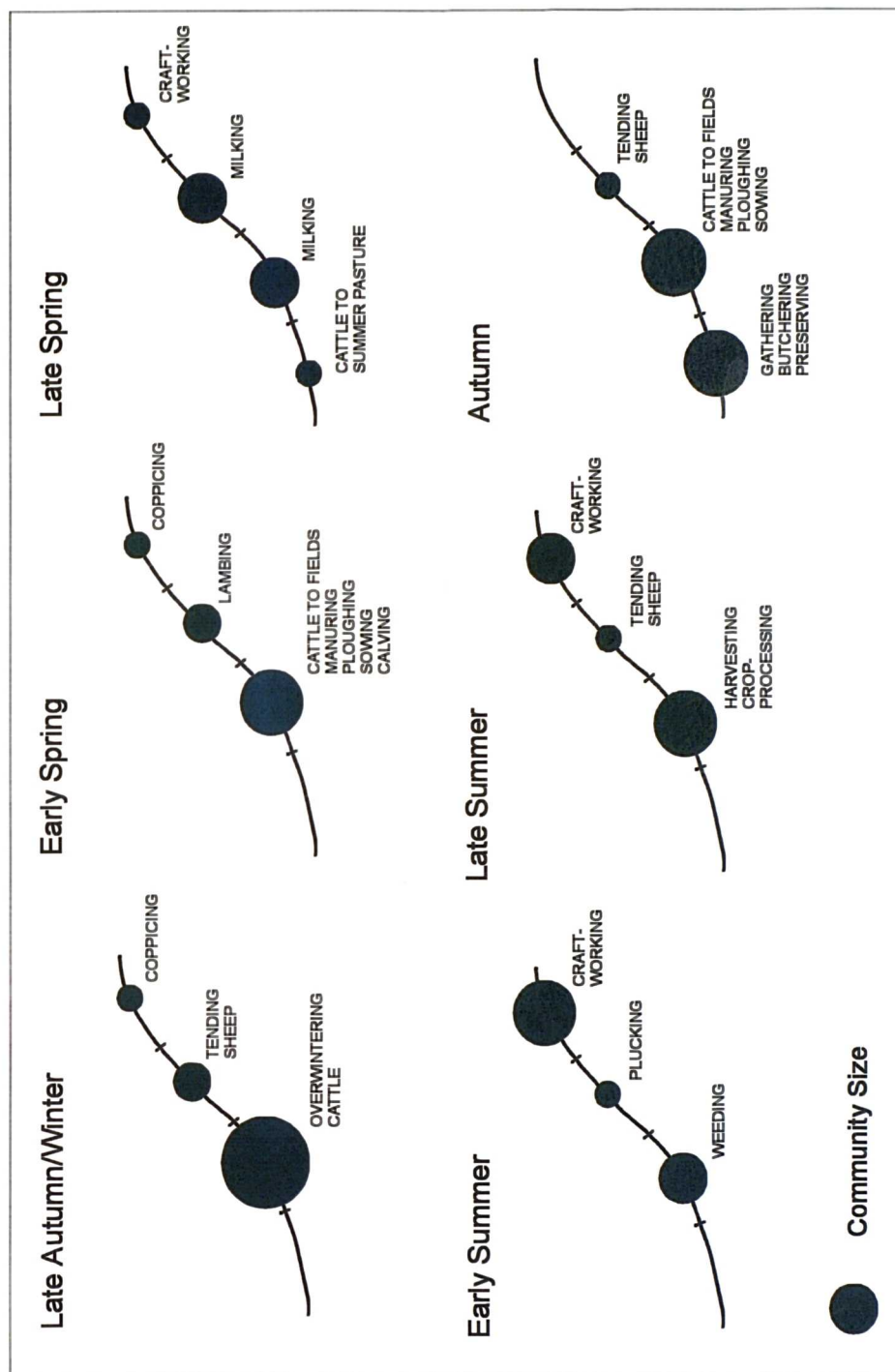


Fig 5.14 A hypothetical model of prehistoric land-use

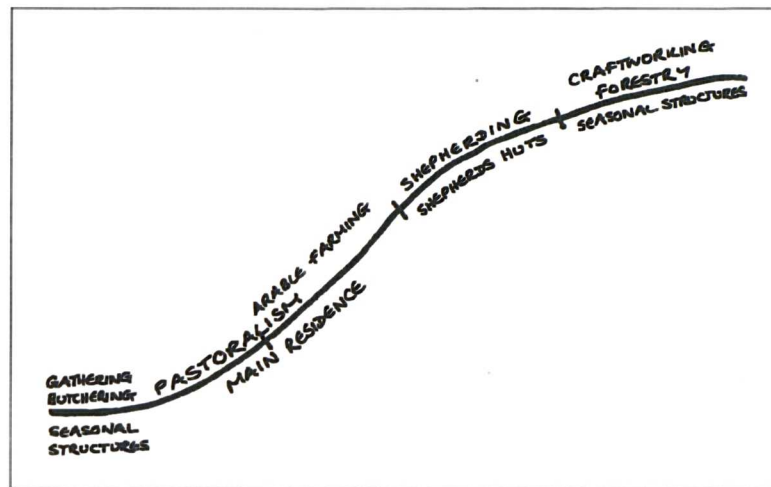


Fig 5.15 Roundhouses in the landscape

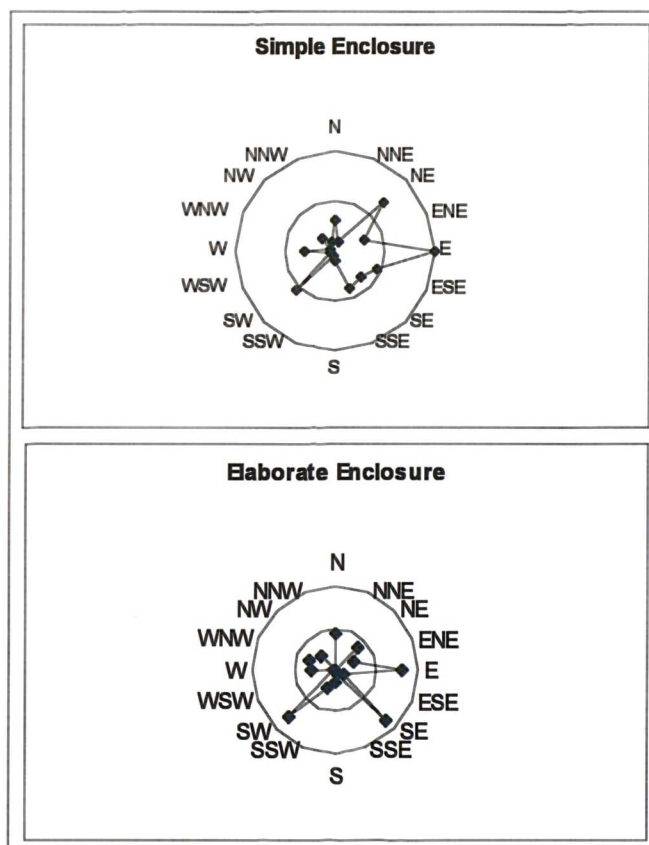


Fig 5.16 Orientation of enclosures in north and central Britain

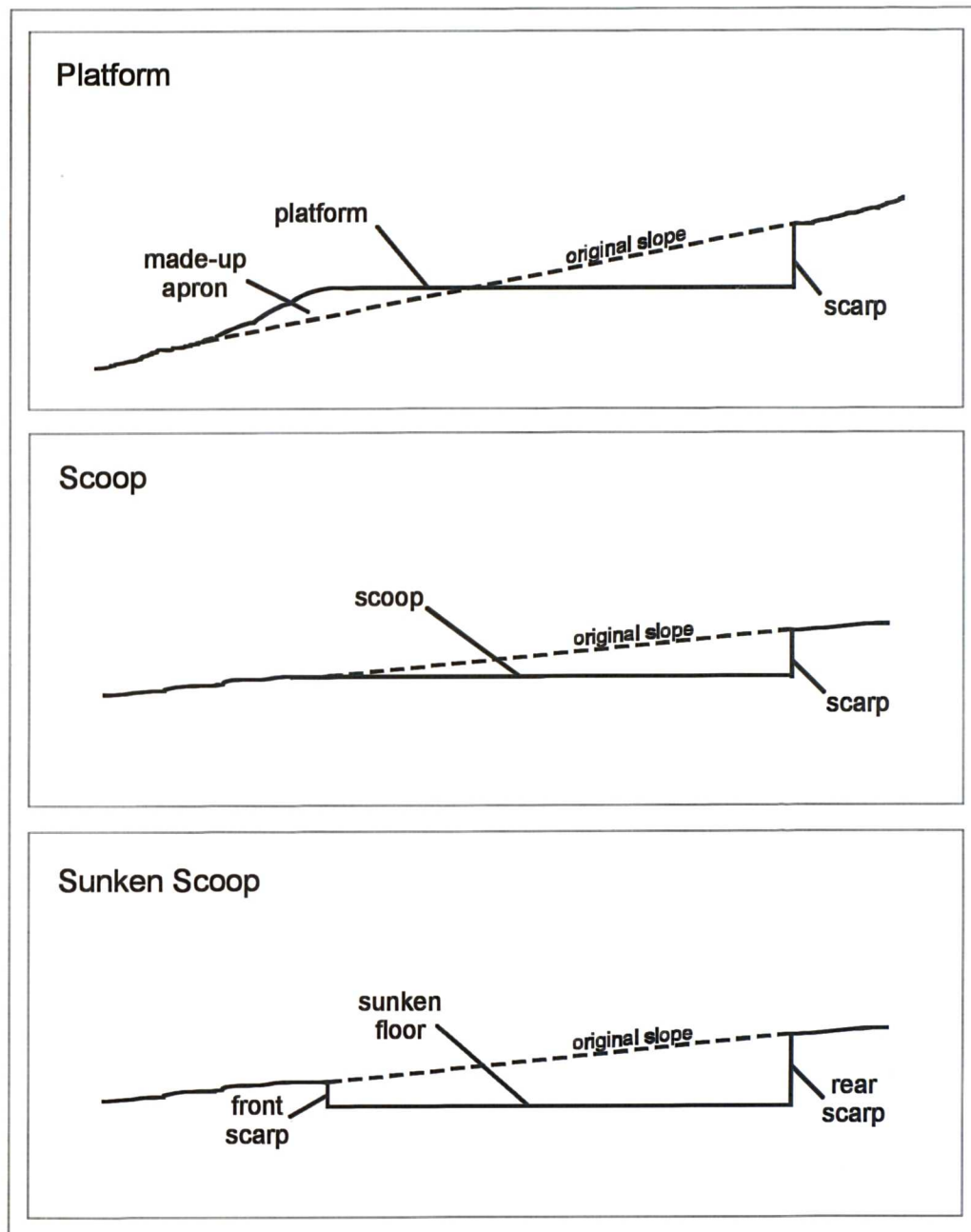


Fig 5.17 Methods of preparing a slope for house construction

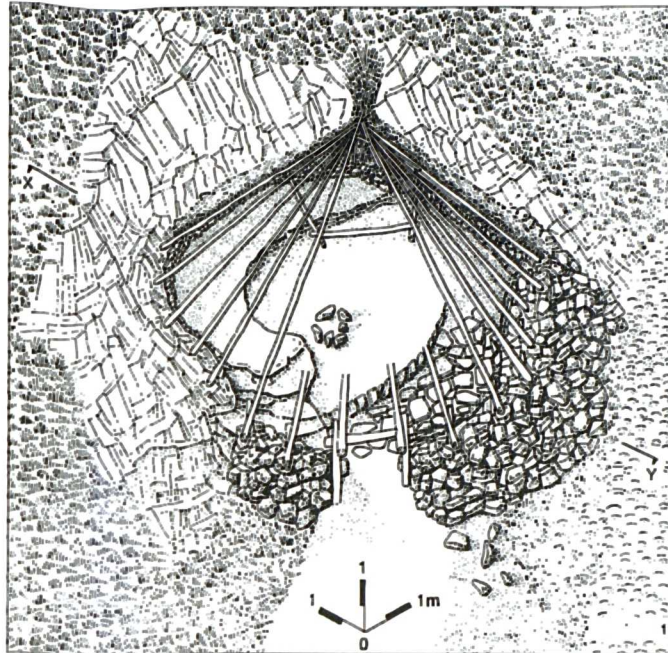


Fig 5.18 House construction in a scoop at the Dunion
(after Rideout 1992)

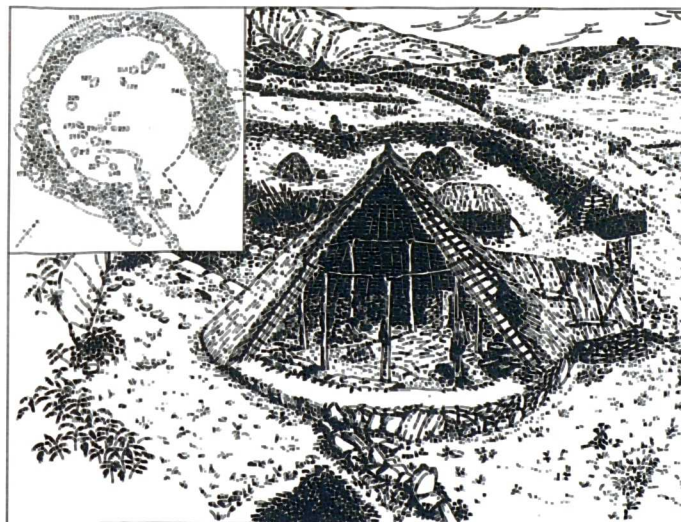


Fig 5.19 Building inside the scarp at Ty Mawr
(after Smith 1985)

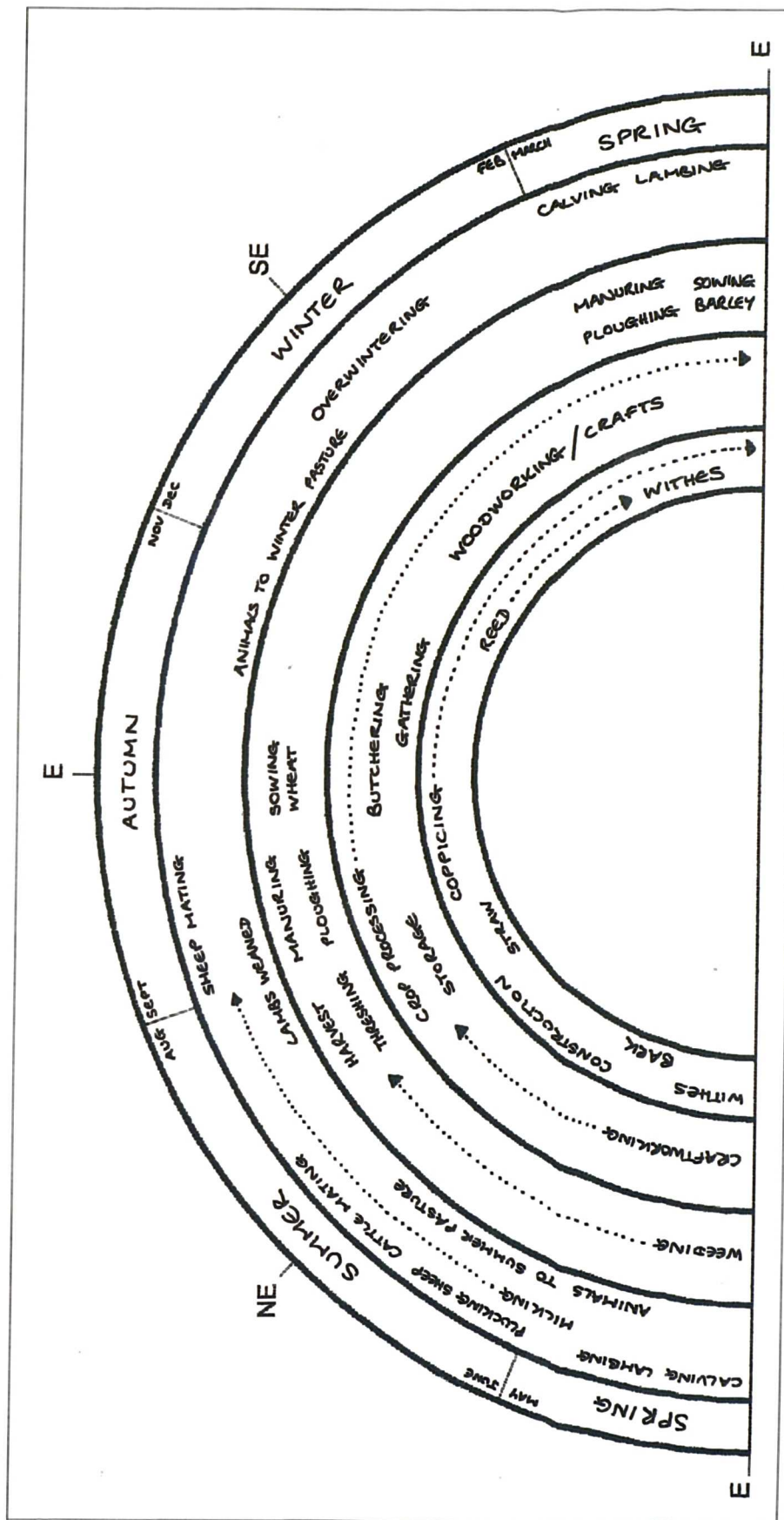


Fig 5.20 Placing construction activities in the prehistoric annual cycle

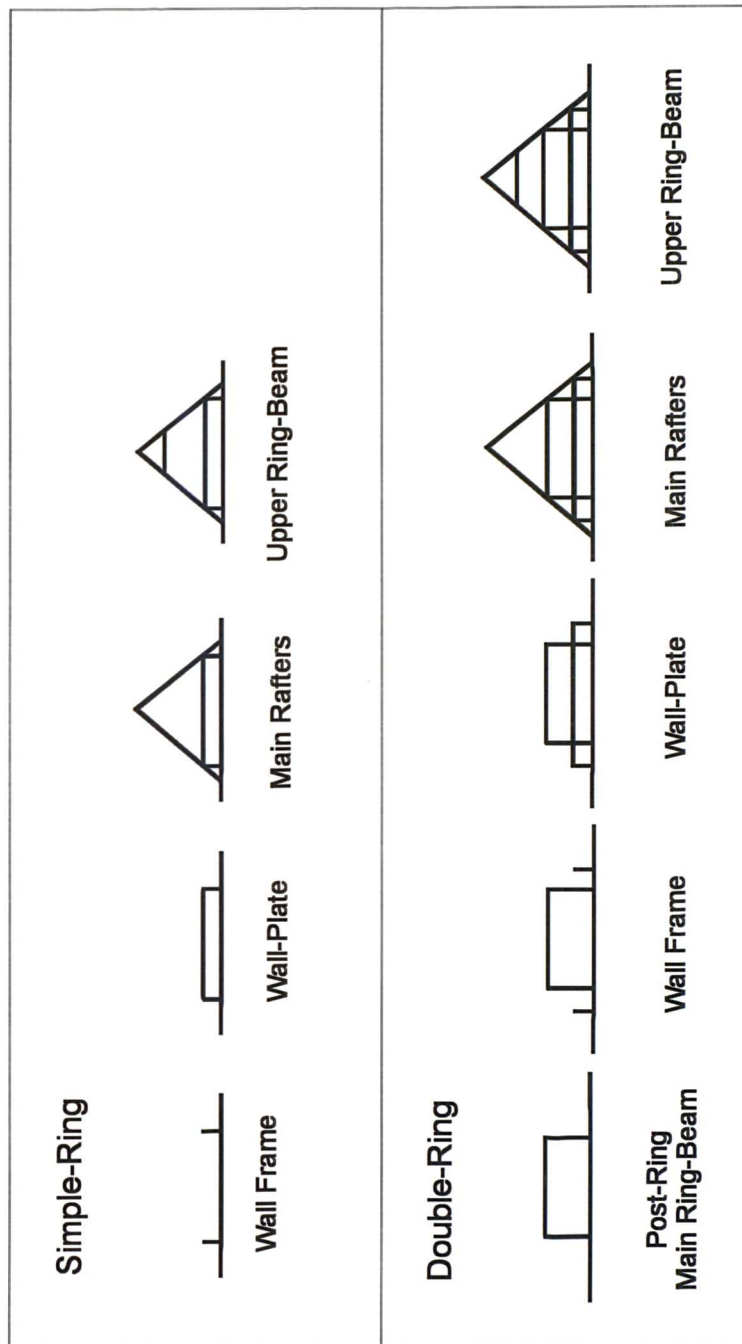


Fig 5.21 Reynolds' construction sequence

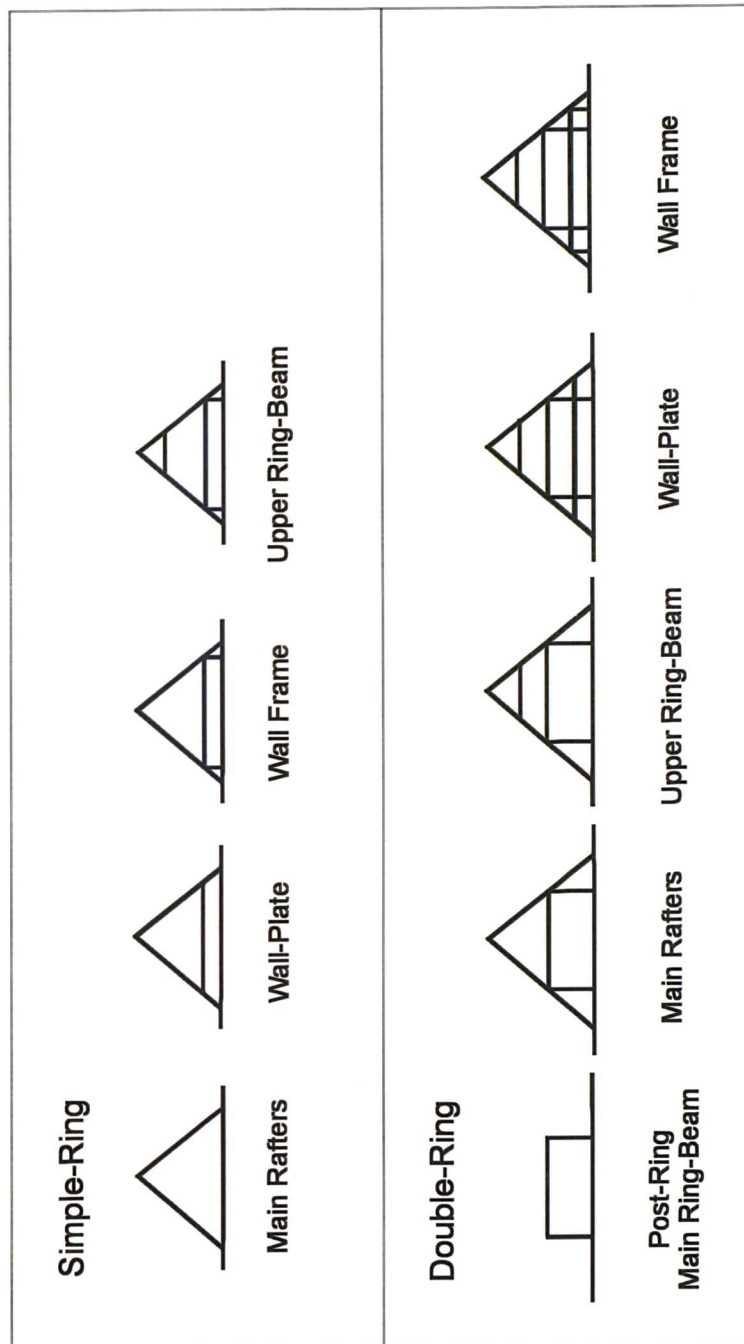


Fig 5.22 A hypothetical construction sequence for stake-walled structures (following Beamish 1998)






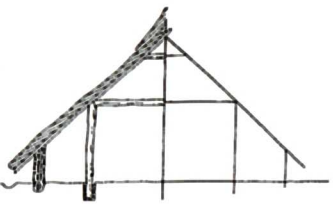

	Wall Height	Roof Pitch	Reference
	1.8 m	25°	Kilbride-Jones (1938)
	2.0 m	22°	Bersu (1947-48b)
	0.9 m	20°	Piggott (1948-49)
	1.6 m	30°	Feachem (1965)
	0.9 m	35°	Brewster (1963)
	1.5 m	45°	Mytum (1986)
			

Fig 5.23 Structural reconstructions of the roundhouse

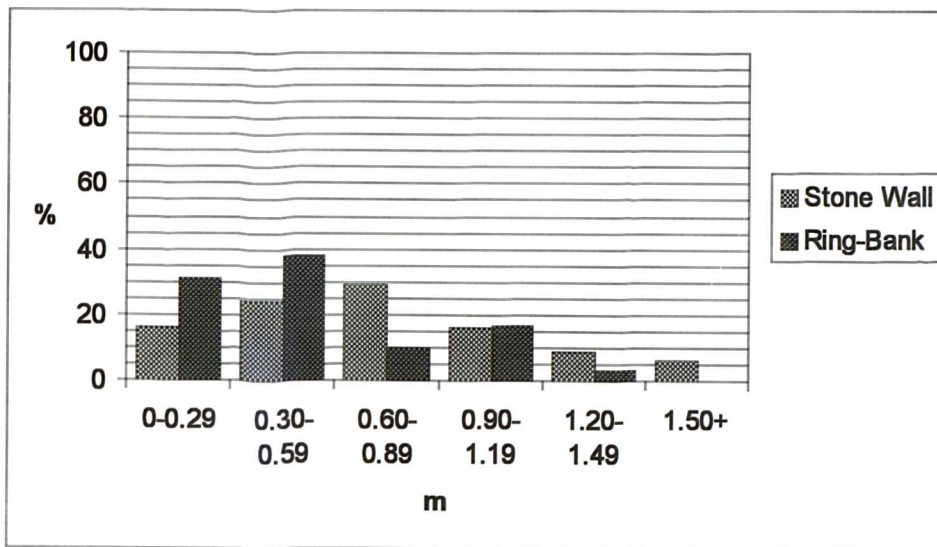


Fig 5.24 Mass wall height

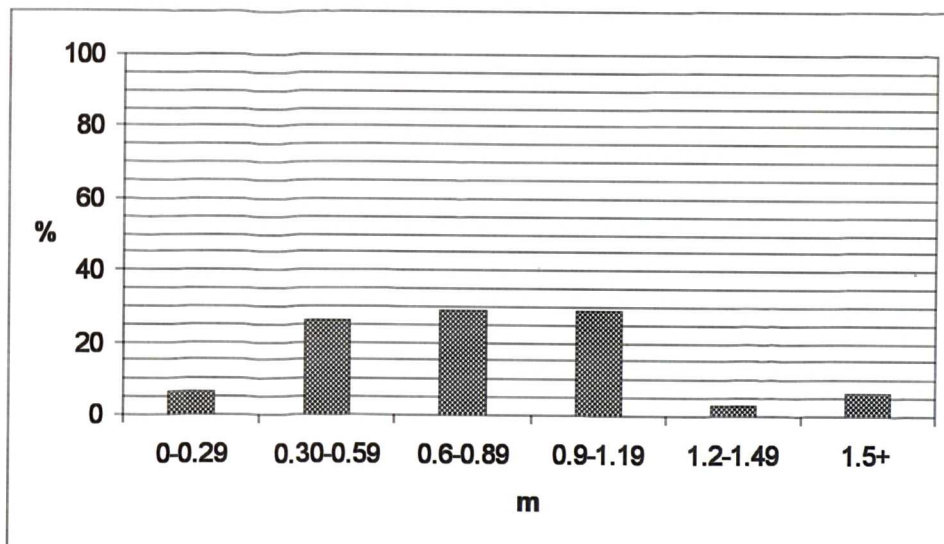


Fig 5.25 Platform scarp height

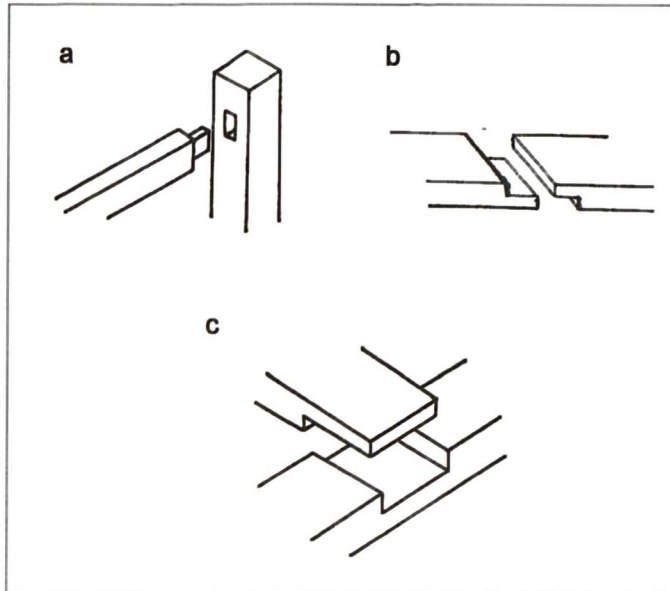


Fig 5.26 Prehistoric joinery techniques: a) mortice and tenon; b) scarf; c) lap (after Hodges 1989)

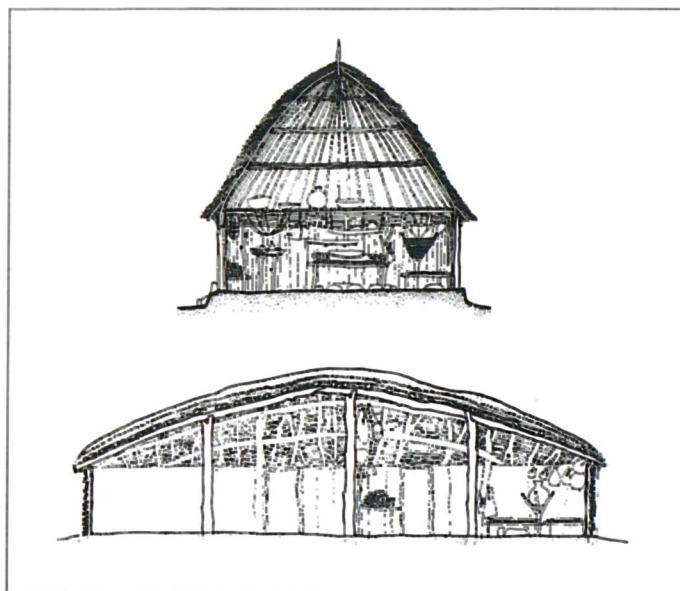


Fig 5.27 Pokot agriculturalist and pastoralist structures (Source: Andersen 1978)

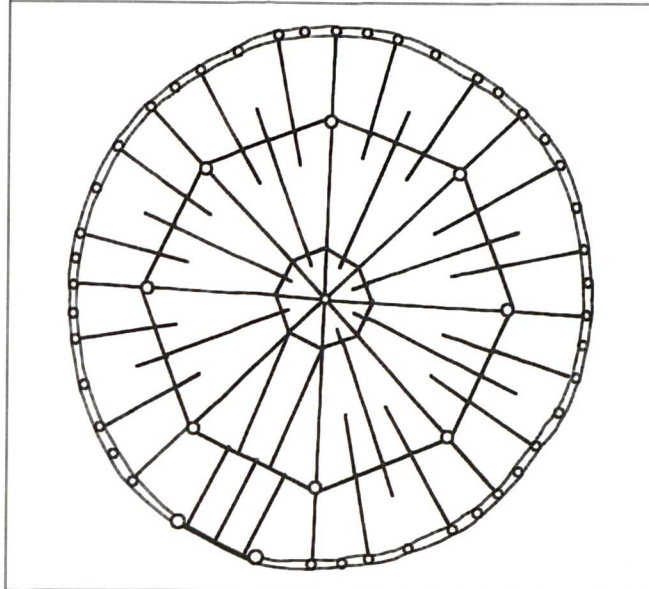


Fig 5.28 Reynolds' technique for placing subsidiary rafters (Source: Mytum 1986)

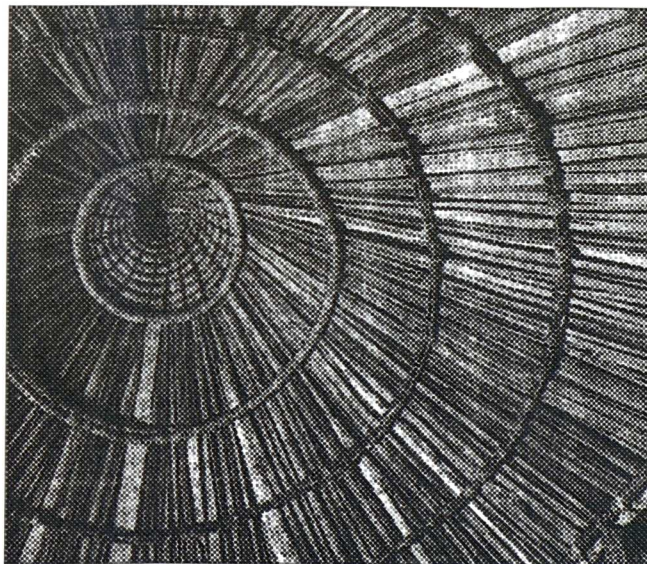


Fig 5.29 Use of purlins in traditional African architecture (Source: Oliver 1987)

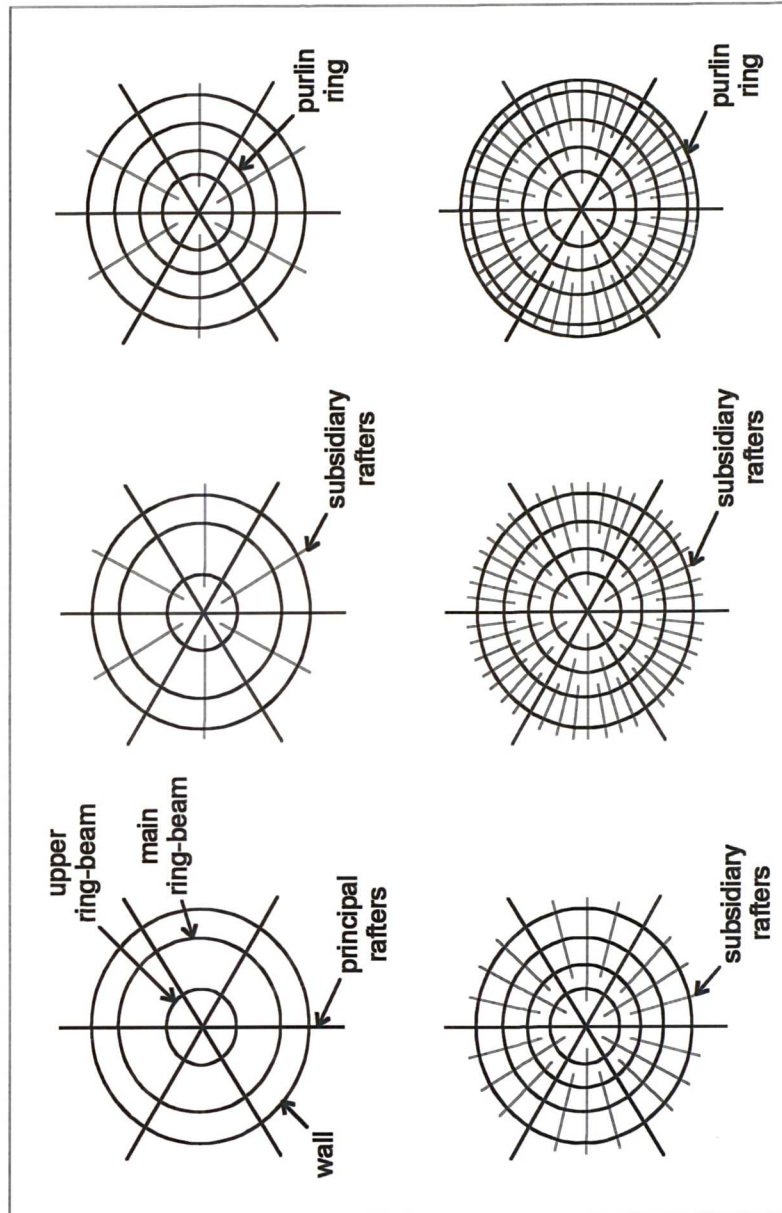


Fig 5.30 A technique for the positioning of subsidiary rafters involving the use of purlins

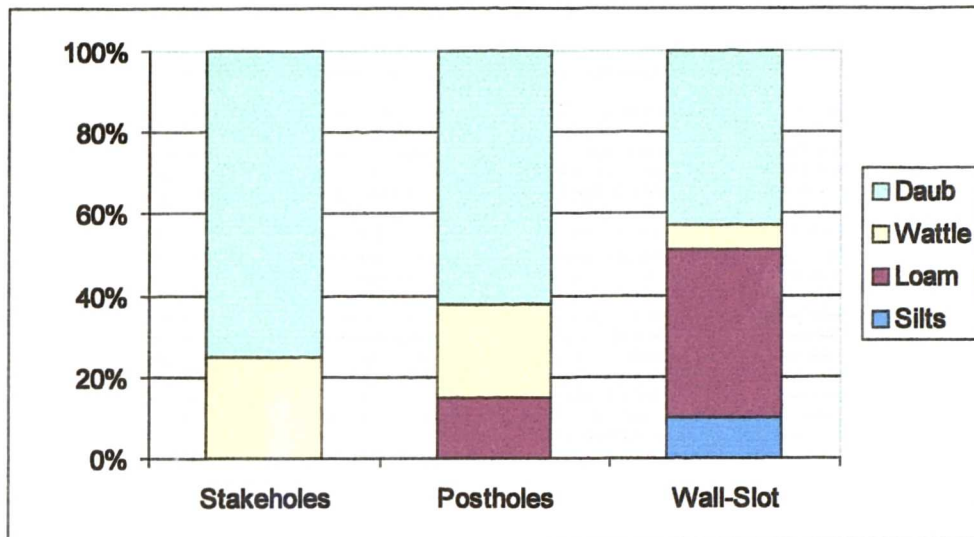


Fig 5.31 Outer wall feature inclusions and fills

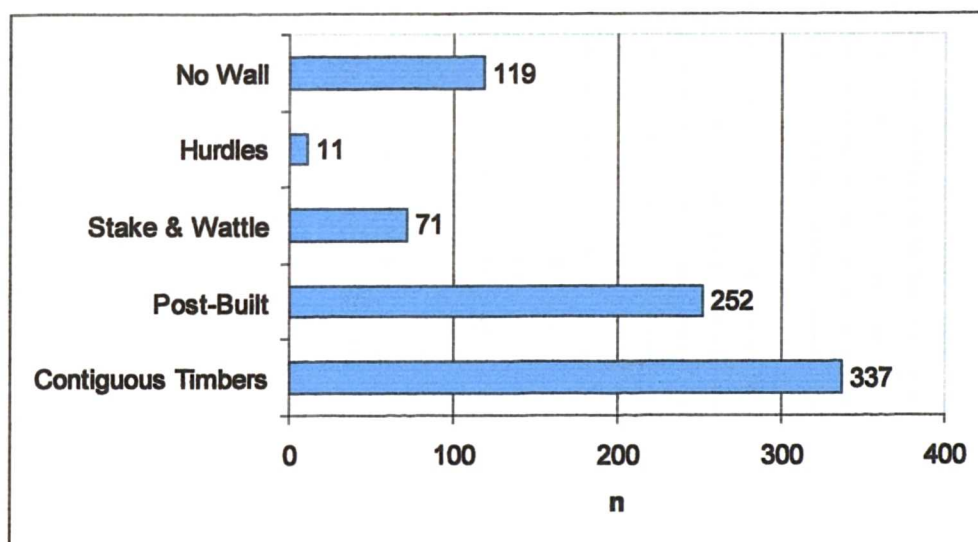


Fig 5.32 Timber-built walls in northern and central Britain

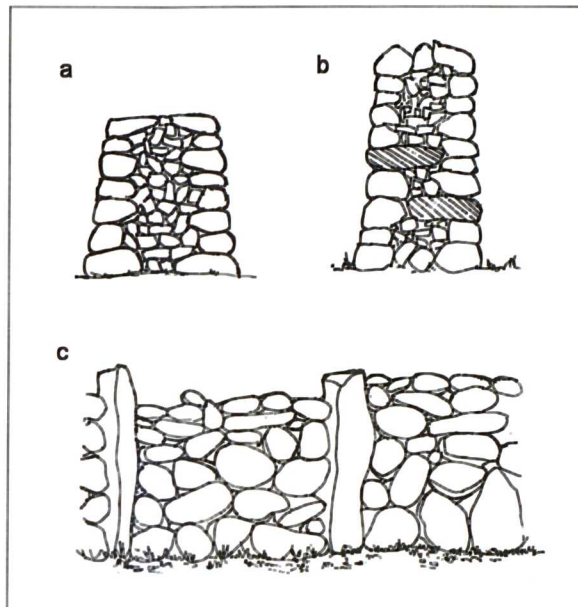


Fig 5.33 Drystone walling: a) a typical cross-section; b) use of 'through' stones; c) orthostat construction (after Brooks 1986)

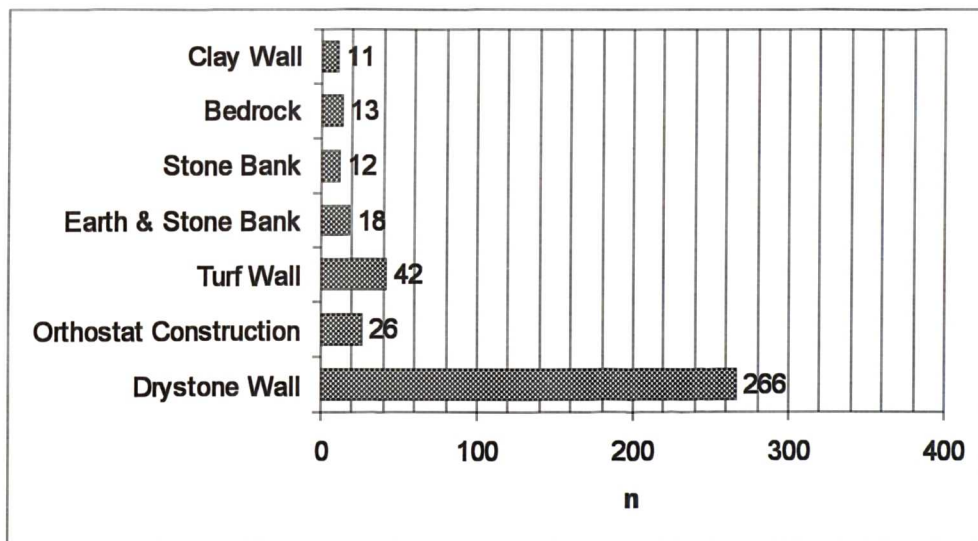


Fig 5.34 Mass walls in north and central Britain

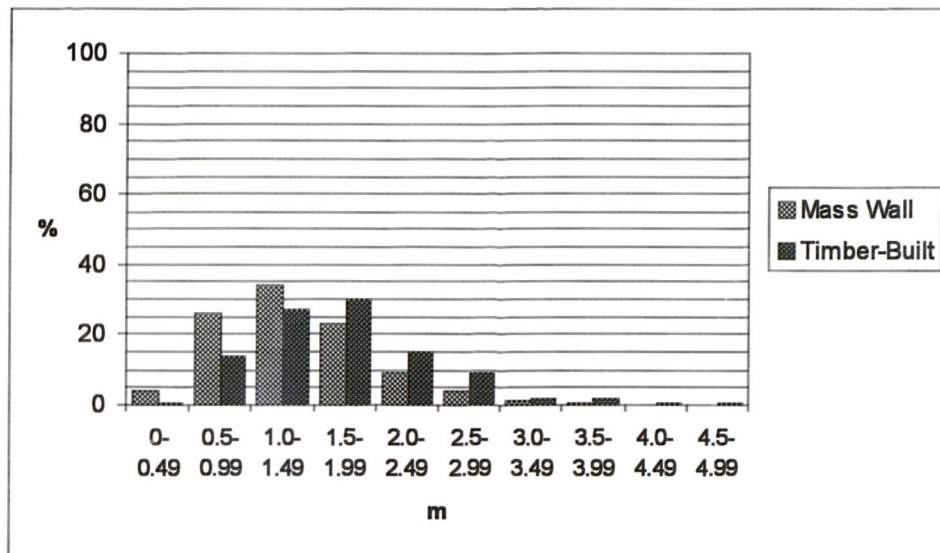


Fig 5.35 Door width in timber and mass walled structures

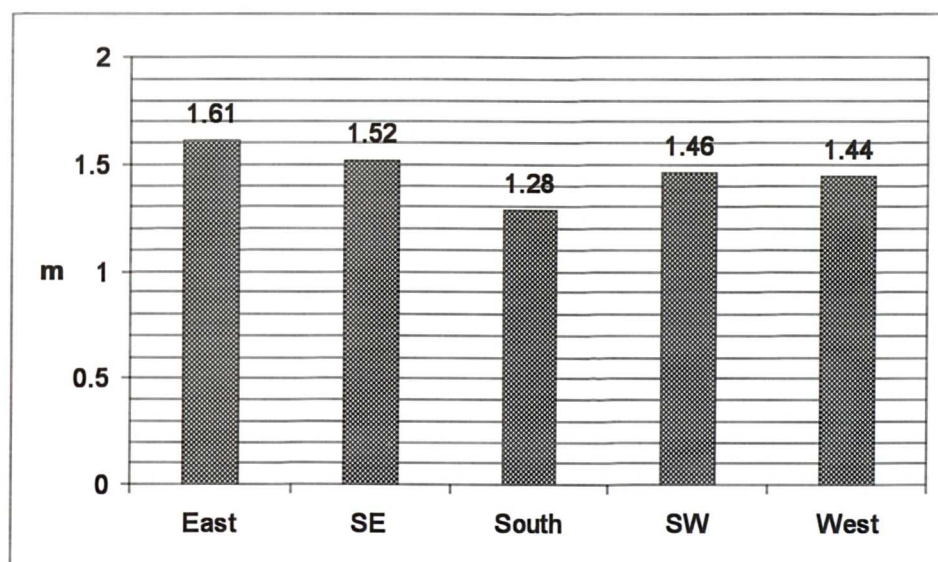


Fig 5.36 Door width according to slope

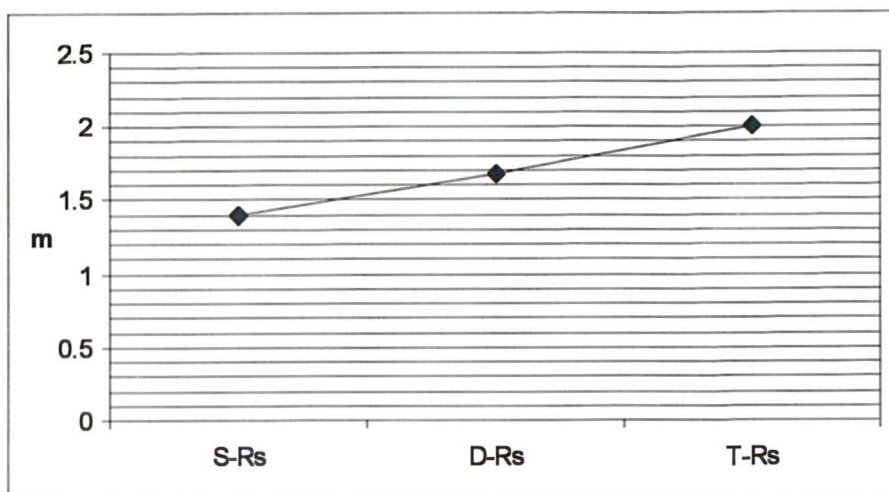


Fig 5.37 Door width and structure type

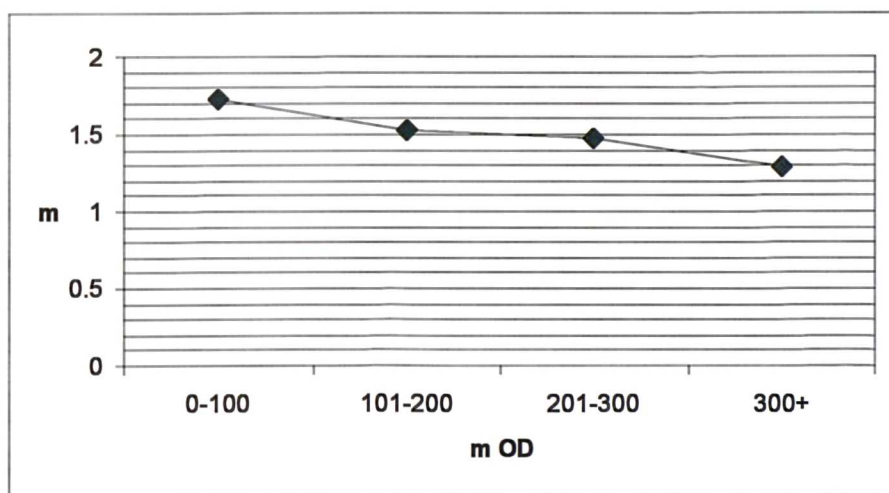


Fig 5.38 Door width and height above sea level

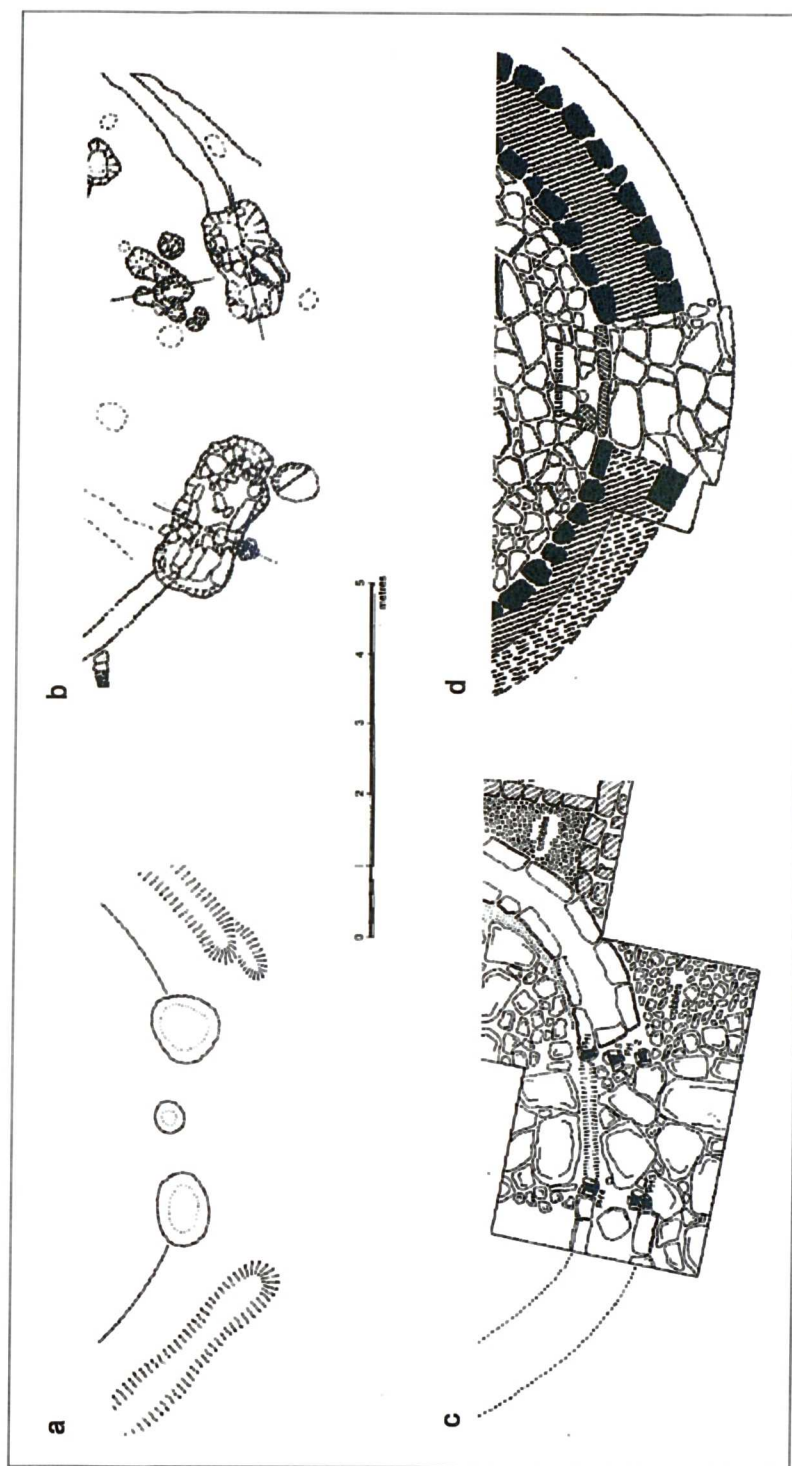


Fig 5.39 Entrance Features: a) LrIA Collfryn CS 9; b) LrIA St. Germain CS 3; c) RIA Woolaw CS 2; d) RIA Crock Cleugh East CS 1

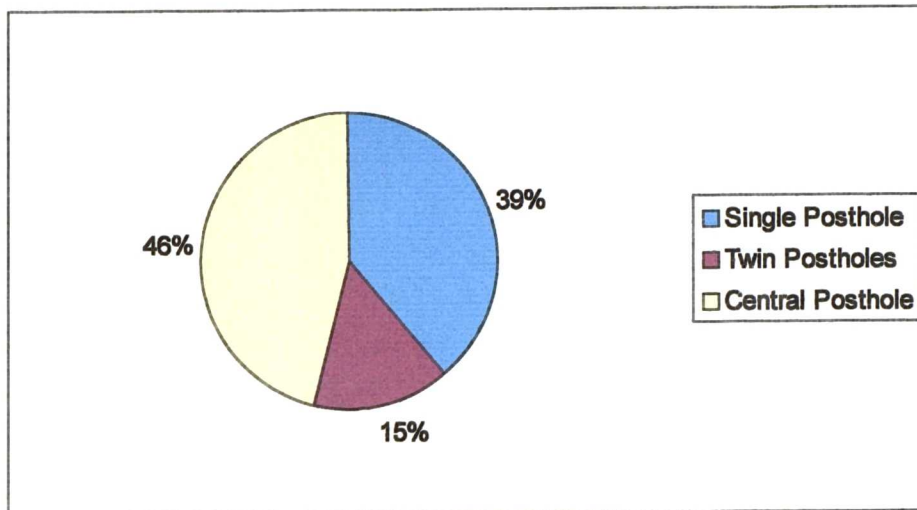


Fig 5.40 Type of door furniture

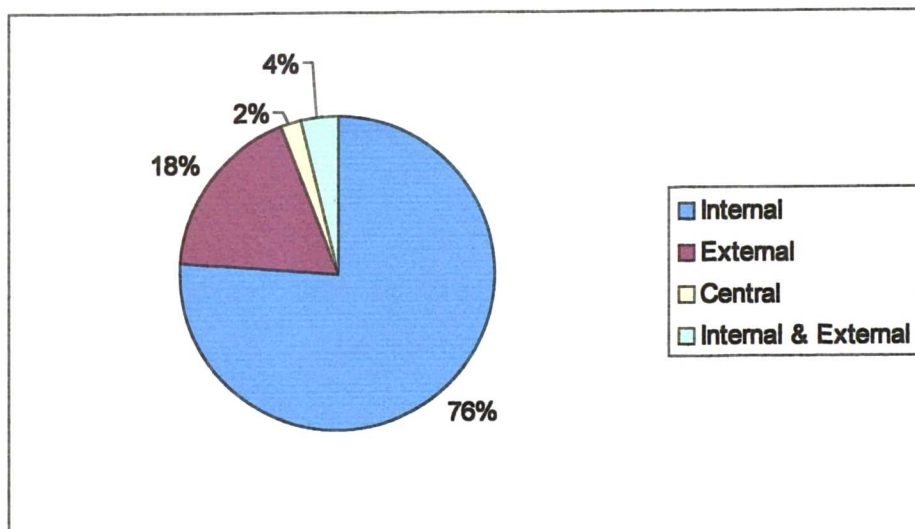


Fig 5.41 Position of door furniture

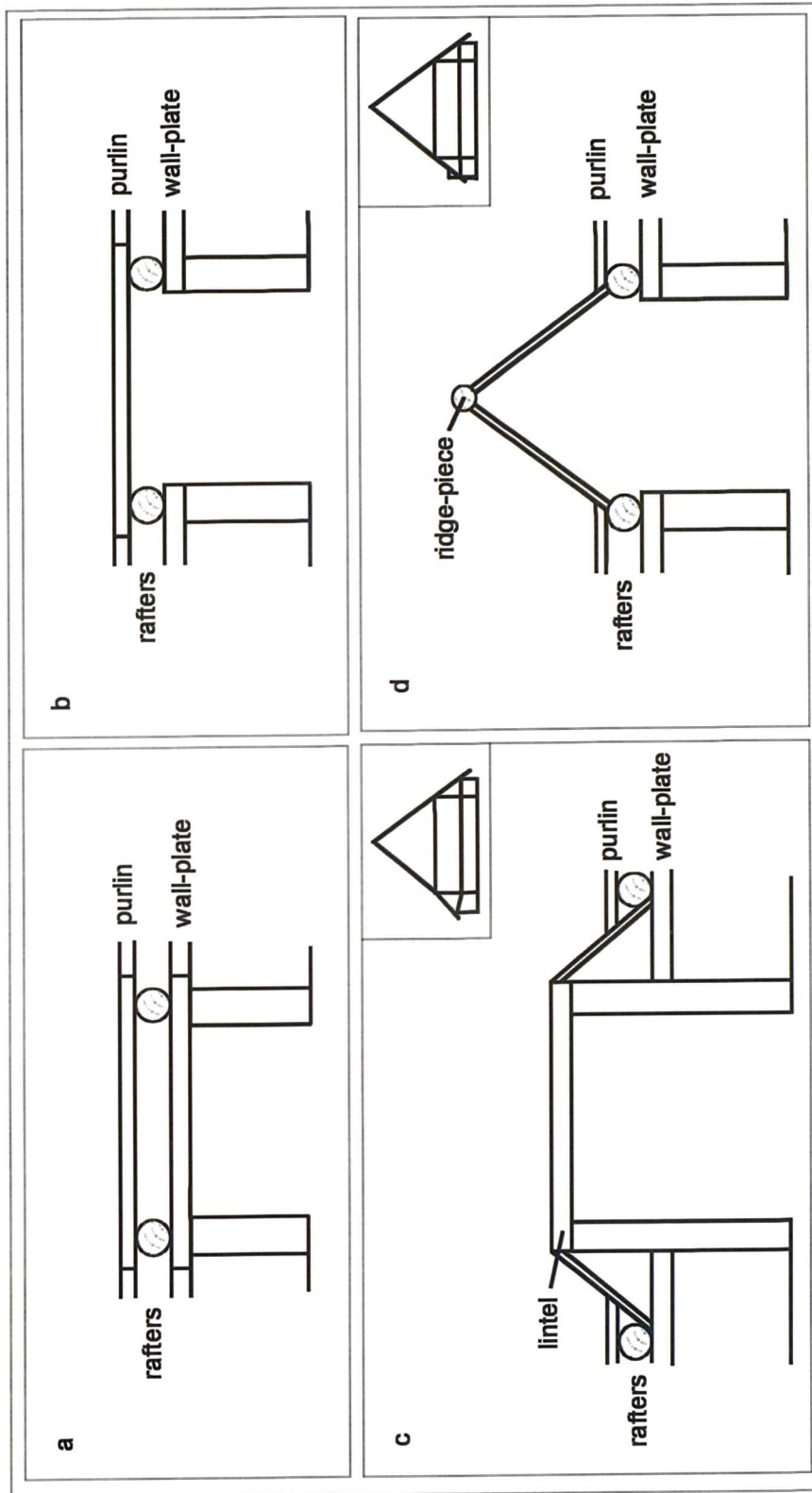


Fig 5.42 Doorway height: a) the continuous wall-plate; b) the purlin as lintel; c) raising wall height; d) the A-frame

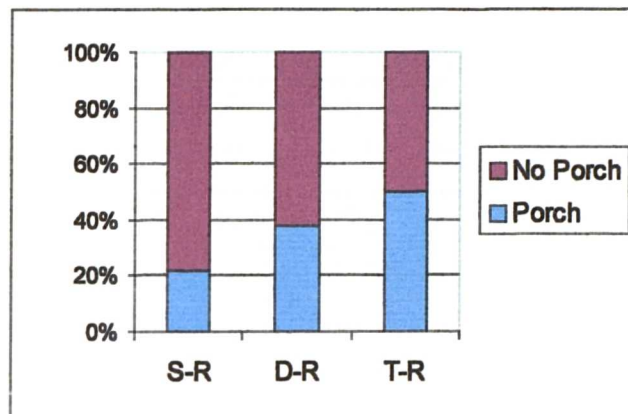


Fig 5.43 Structure type and the provision of a porch

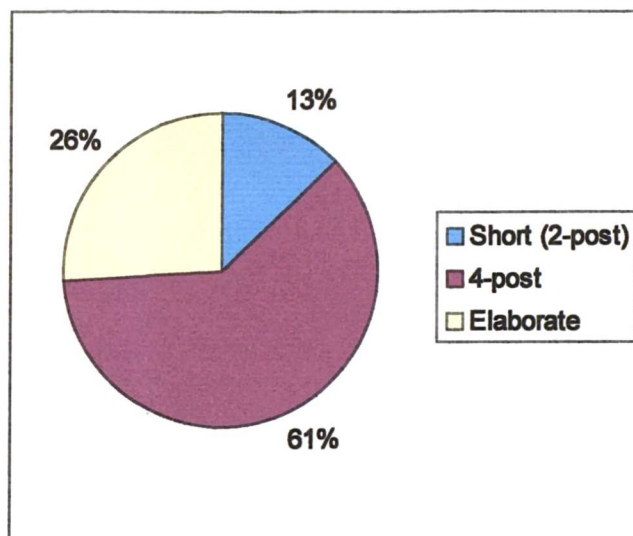


Fig 5.44 Porch Type

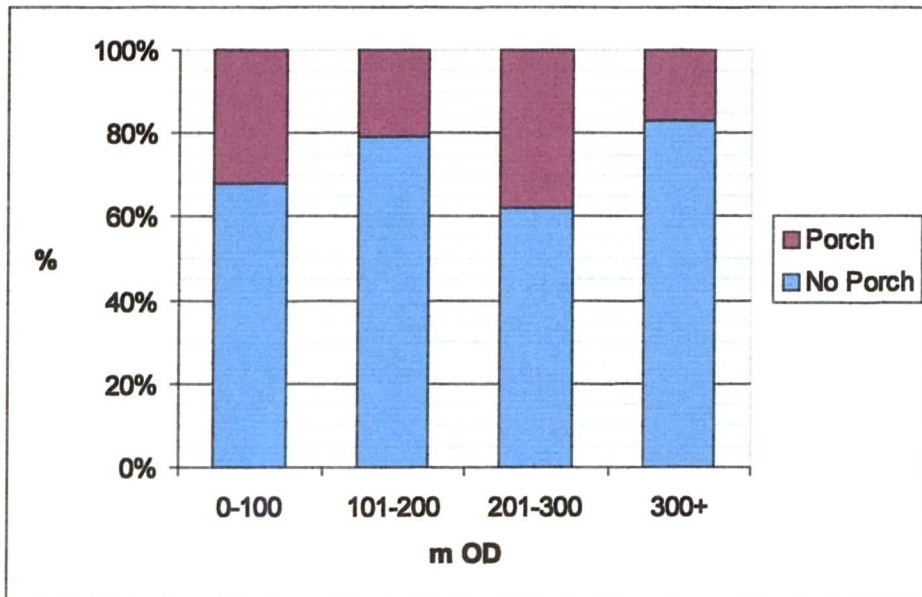


Fig 5.45 Height above sea level and the provision of a porch

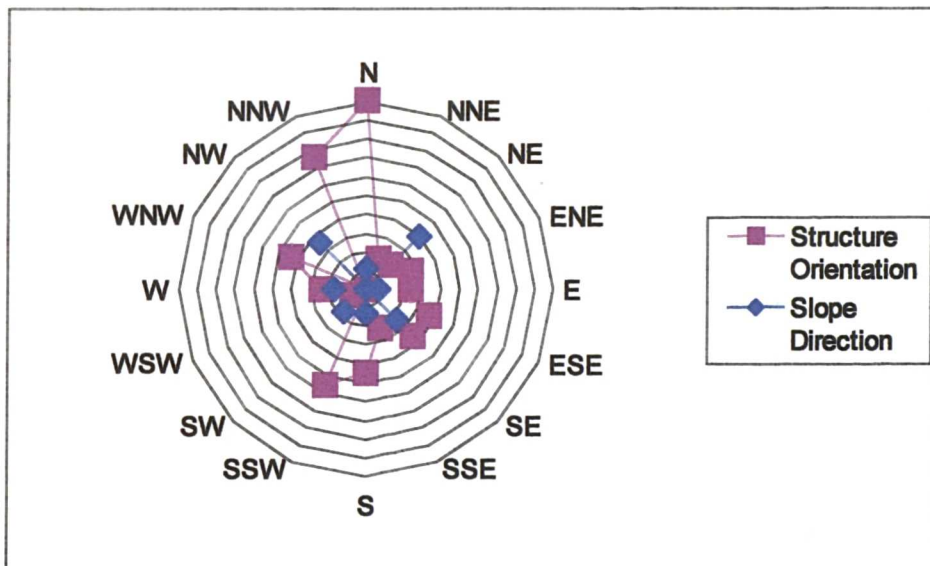


Fig 5.46 The provision of a porch according to slope direction and structure orientation

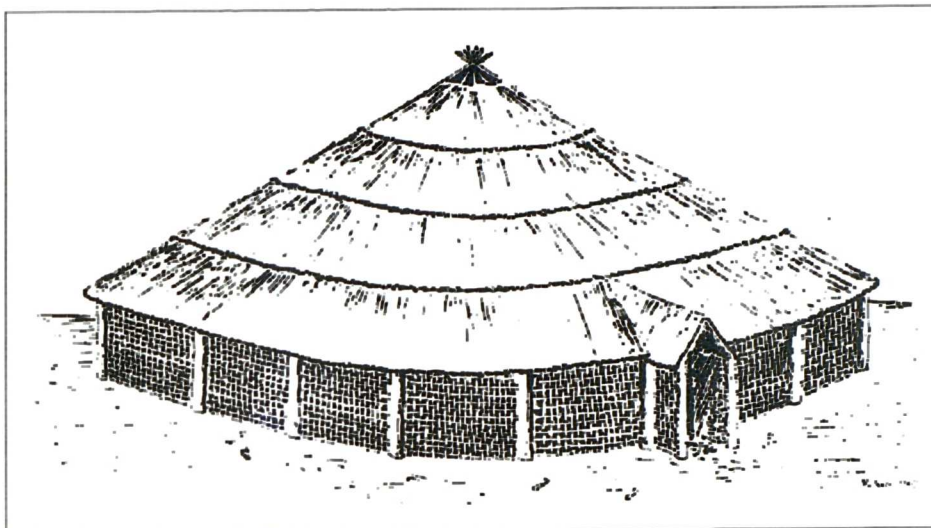


Fig 5.47 Brewster's (1963) porch reconstruction at Staple Howe

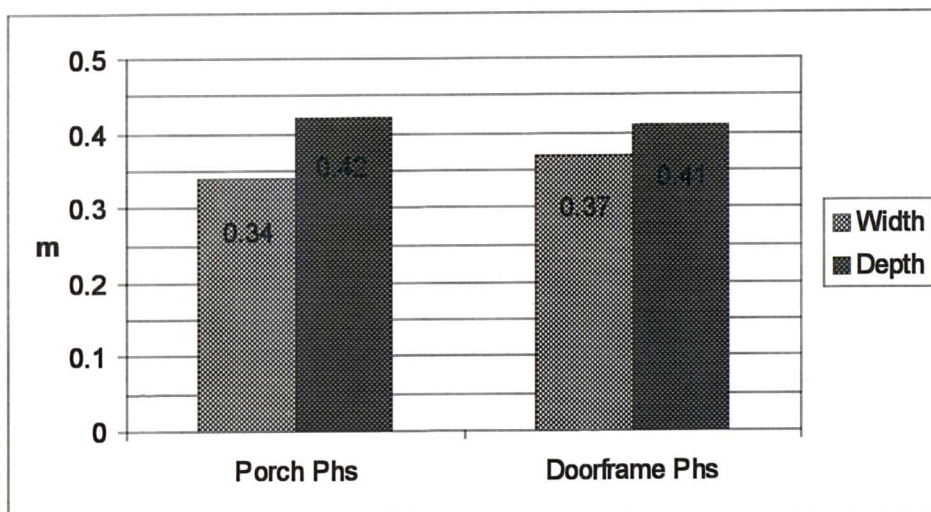


Fig 5.48 Dimensions of entrance postholes

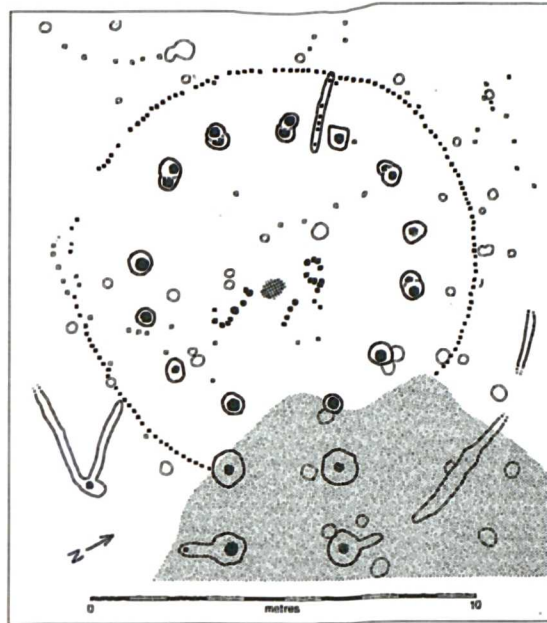


Fig 5.49 Moel y Gaer P-R 25 (after Guilbert 1975b)

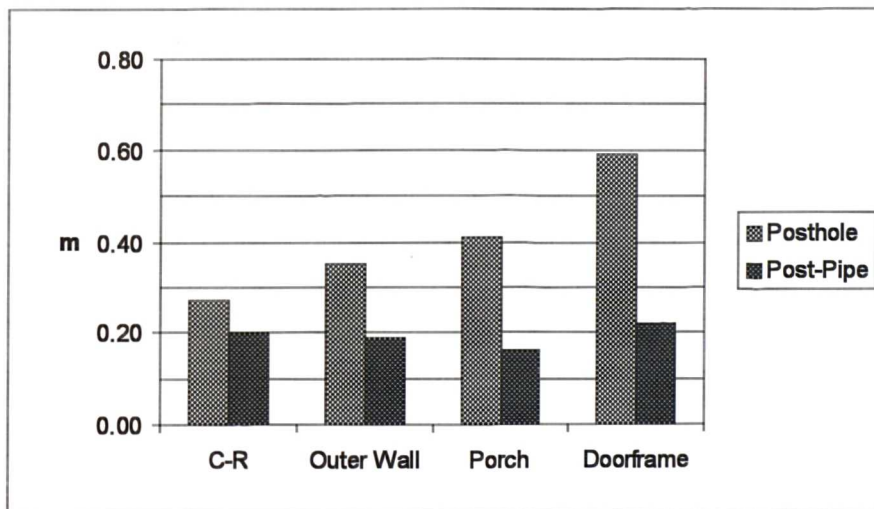


Fig 5.50 Posthole and post-pipe widths

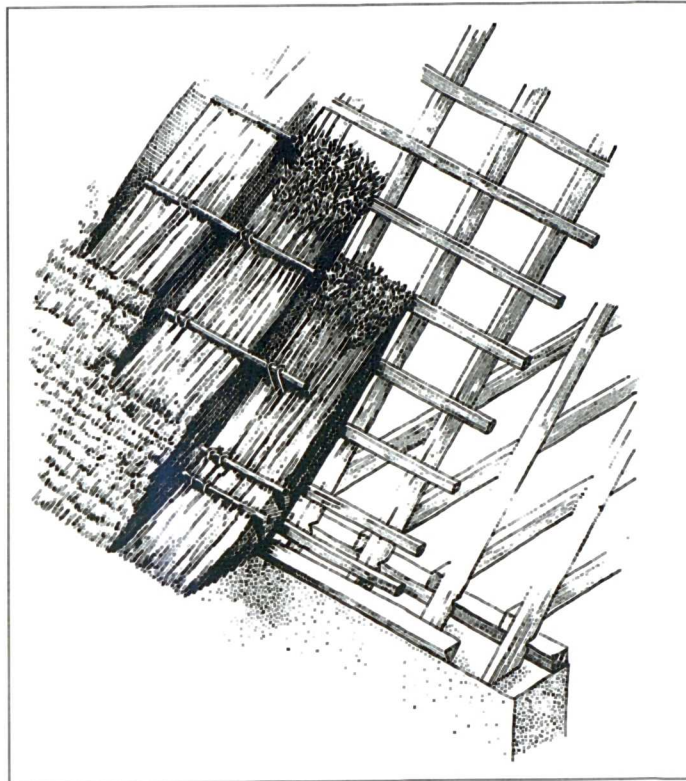


Fig 5.51 Thatching (after English Heritage 2000b)

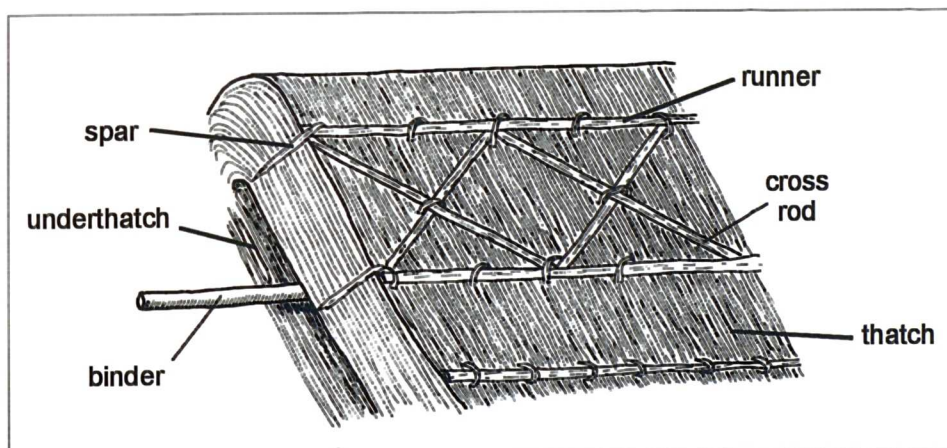


Fig 5.52 Securing the thatch (after Tabor 1994)

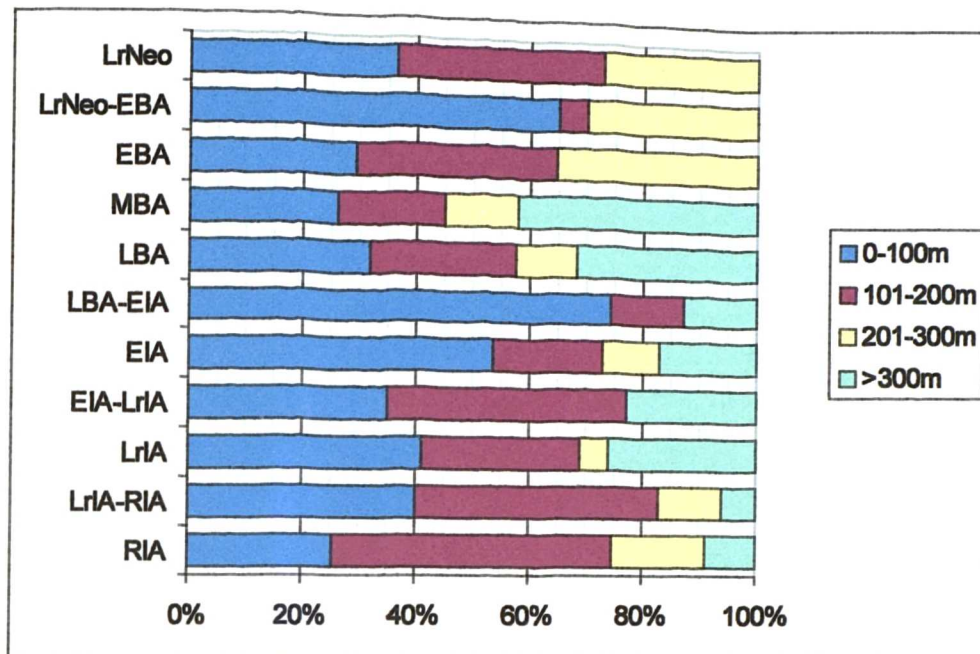


Fig 5.53 Chronological variation in height above sea level

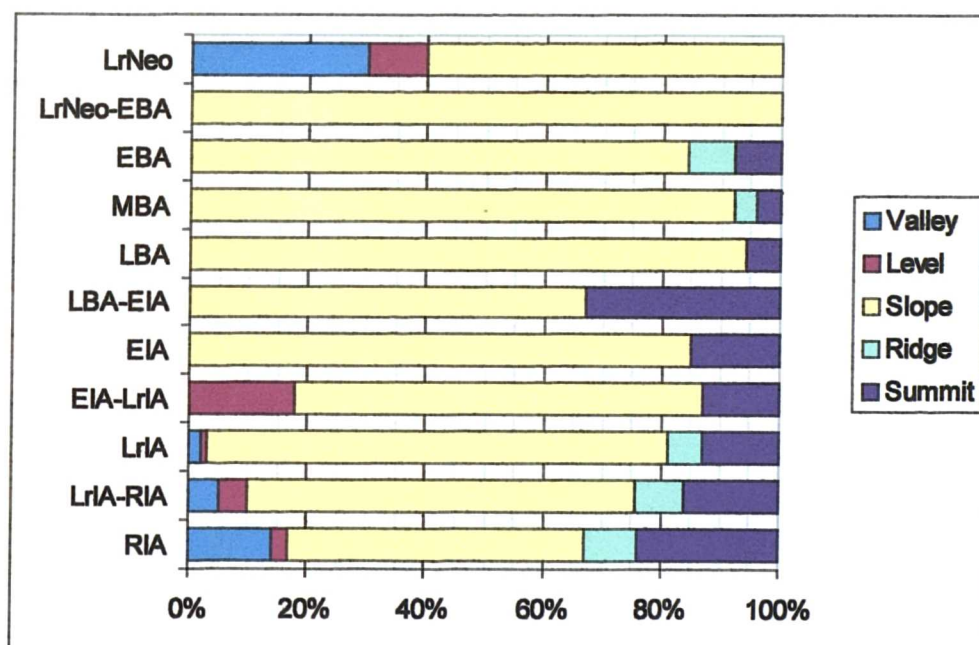


Fig 5.54 Chronological variation in landscape location

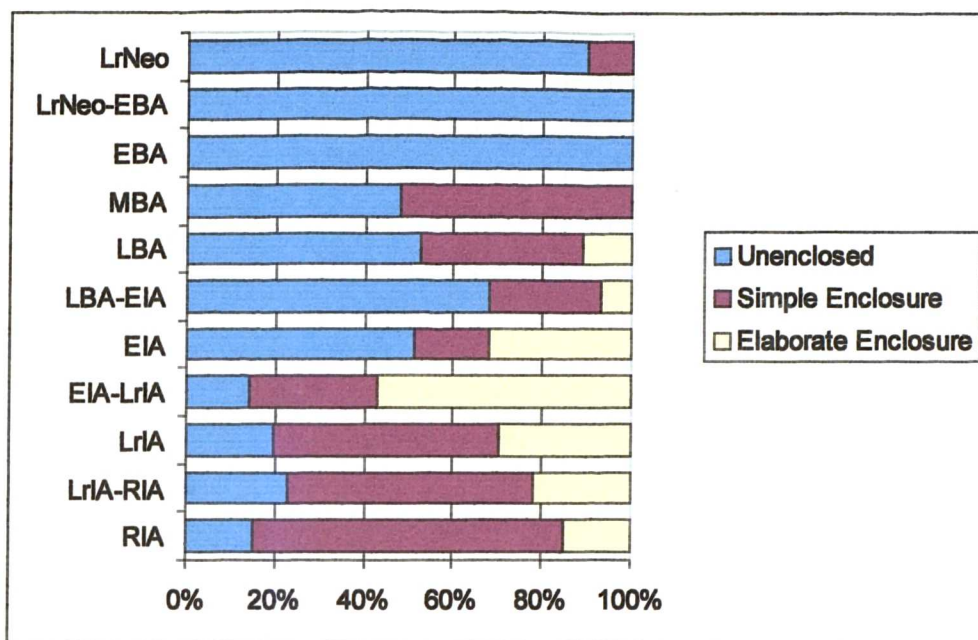


Fig 5.55 Chronological variation in site type

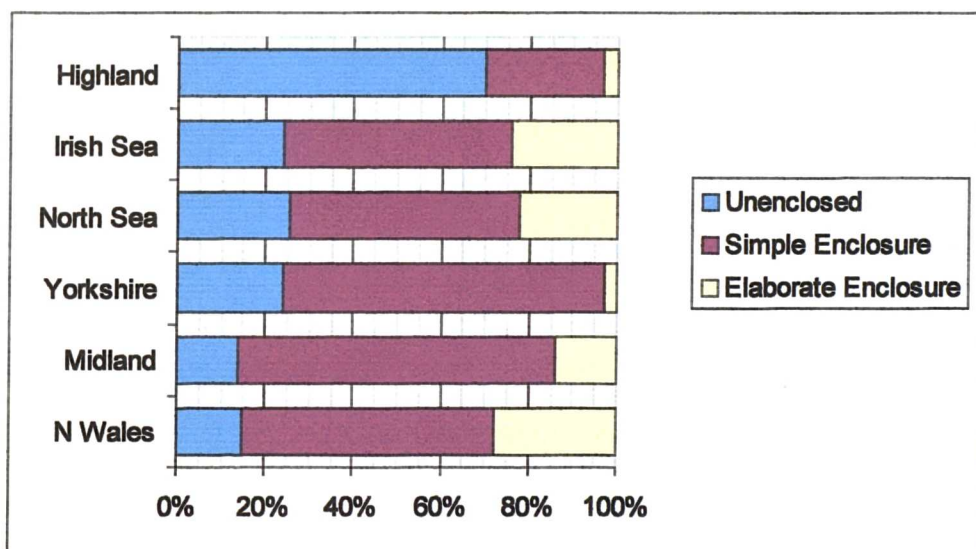


Fig 5.56 Regional variation in site type

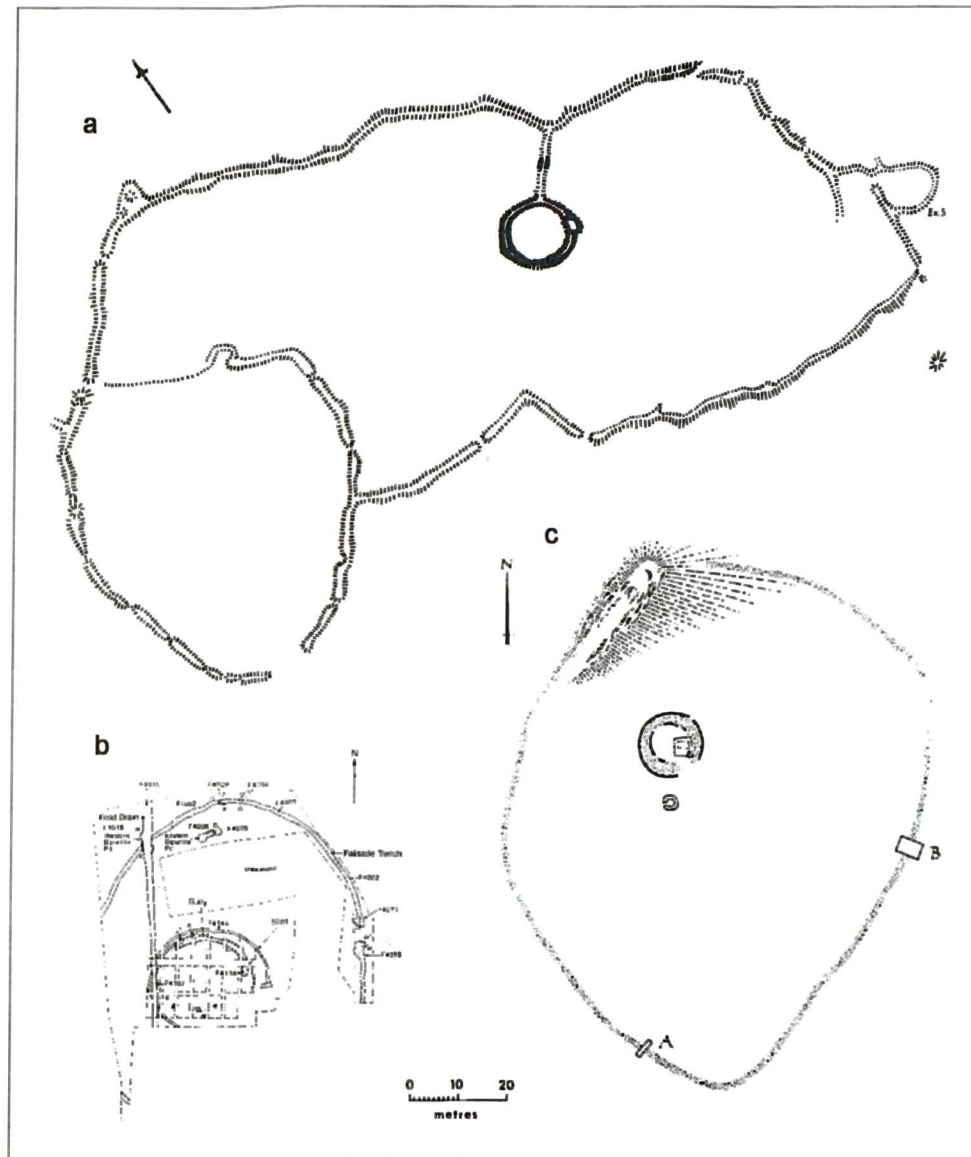


Fig 5.57 MBA enclosure in north and central Britain: a) Bracken Rigg (Durham); b) Melville Nurseries (Midlothian); c) Cùl a' Bhaile (Jura)

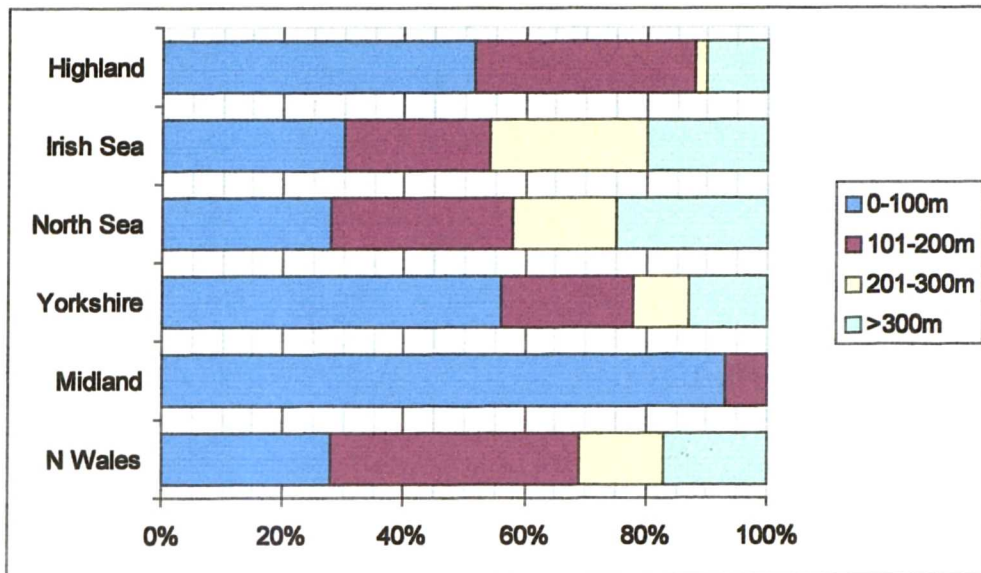


Fig 5.58 Regional variation in height above sea level

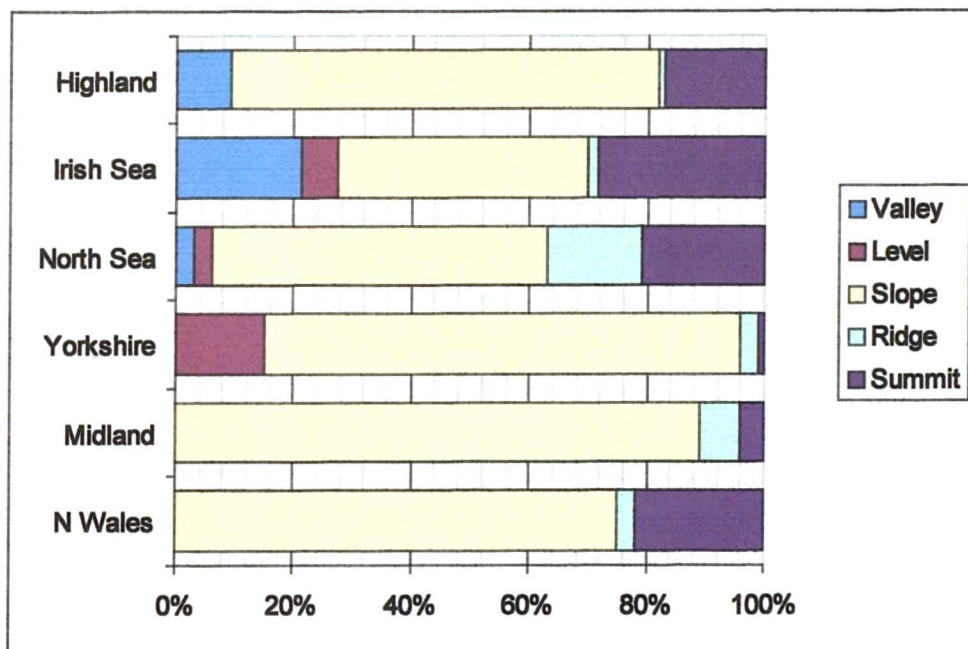


Fig 5.59 Regional variation in landscape location

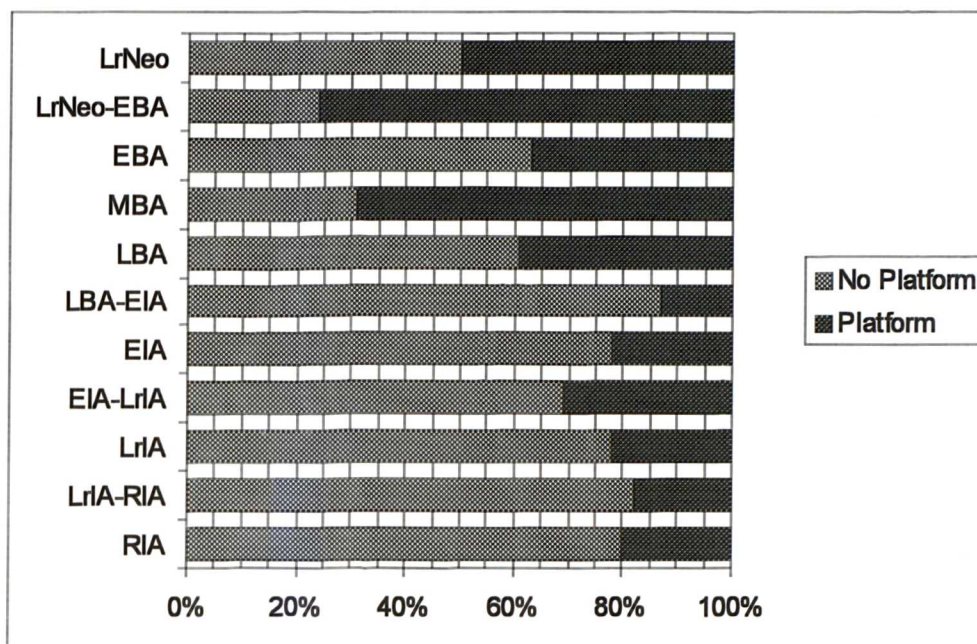


Fig 5.60 Chronological variation in the use of platforms

	N	NE	E	SE	S	SW	W	NW
LrNeo	•						•	
LrNeo-EBA	•						•	
EBA	•						•	
MBA			•					
LBA	•	•		-			-	
LBA-EIA		•						
EIA	•				•			
EIA-LrIA					•			
LrIA	•		-				-	
LrIA-RIA	•				-			
RIA					•		-	-
	N	NE	E	SE	S	SW	W	NW
Highland		-	•		•		-	
Irish Sea	-		•					
North Sea	•				-			
Yorkshire	•		•				-	
Midland			•				•	
N Wales					•		•	

Dot = predominant direction Dash = less dominant direction

Table 5.10 Chronological and regional variation in choice of slope

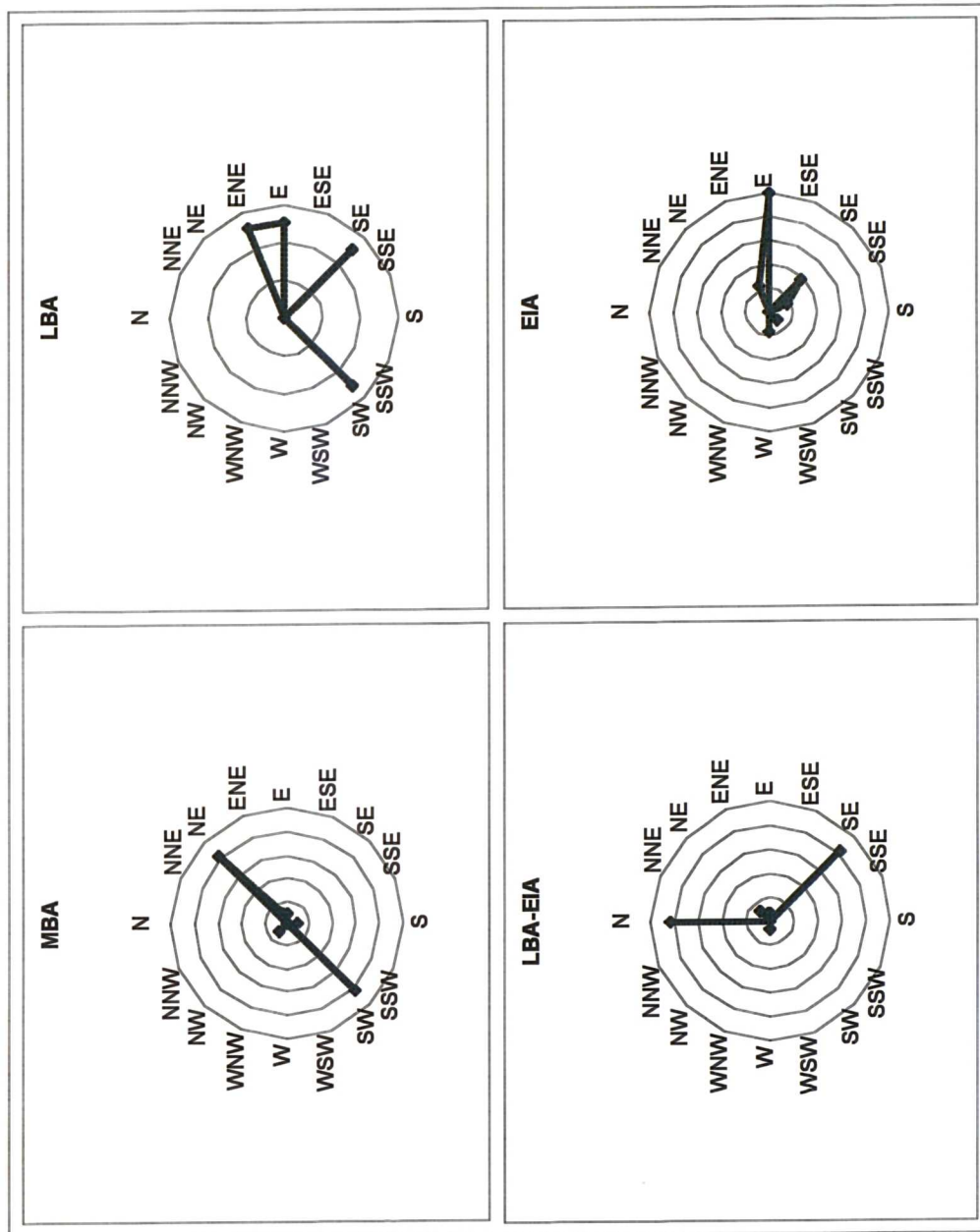


Fig 5.61 Chronological variation in enclosure orientation in north and central Britain

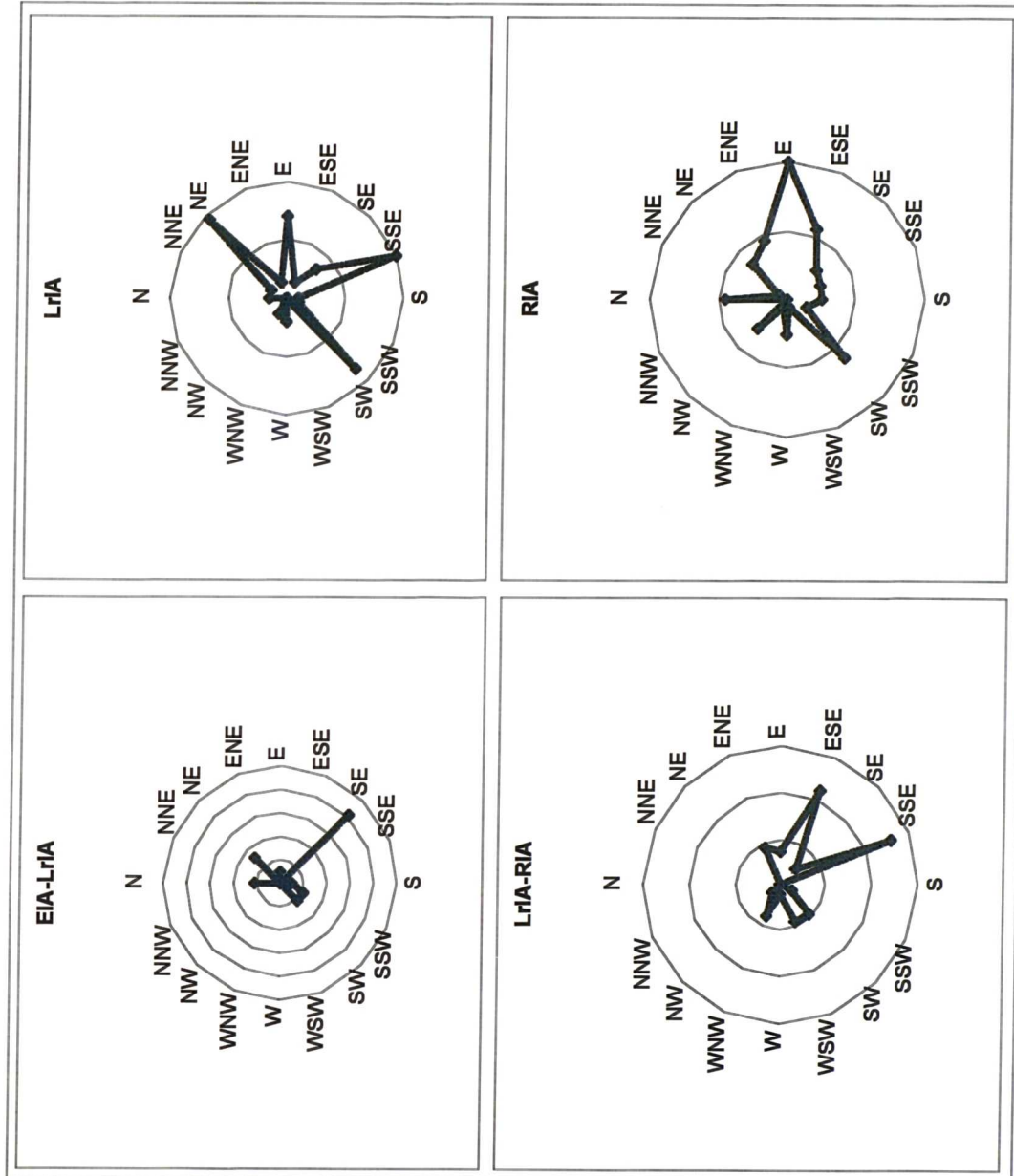


Fig 5.61 continued

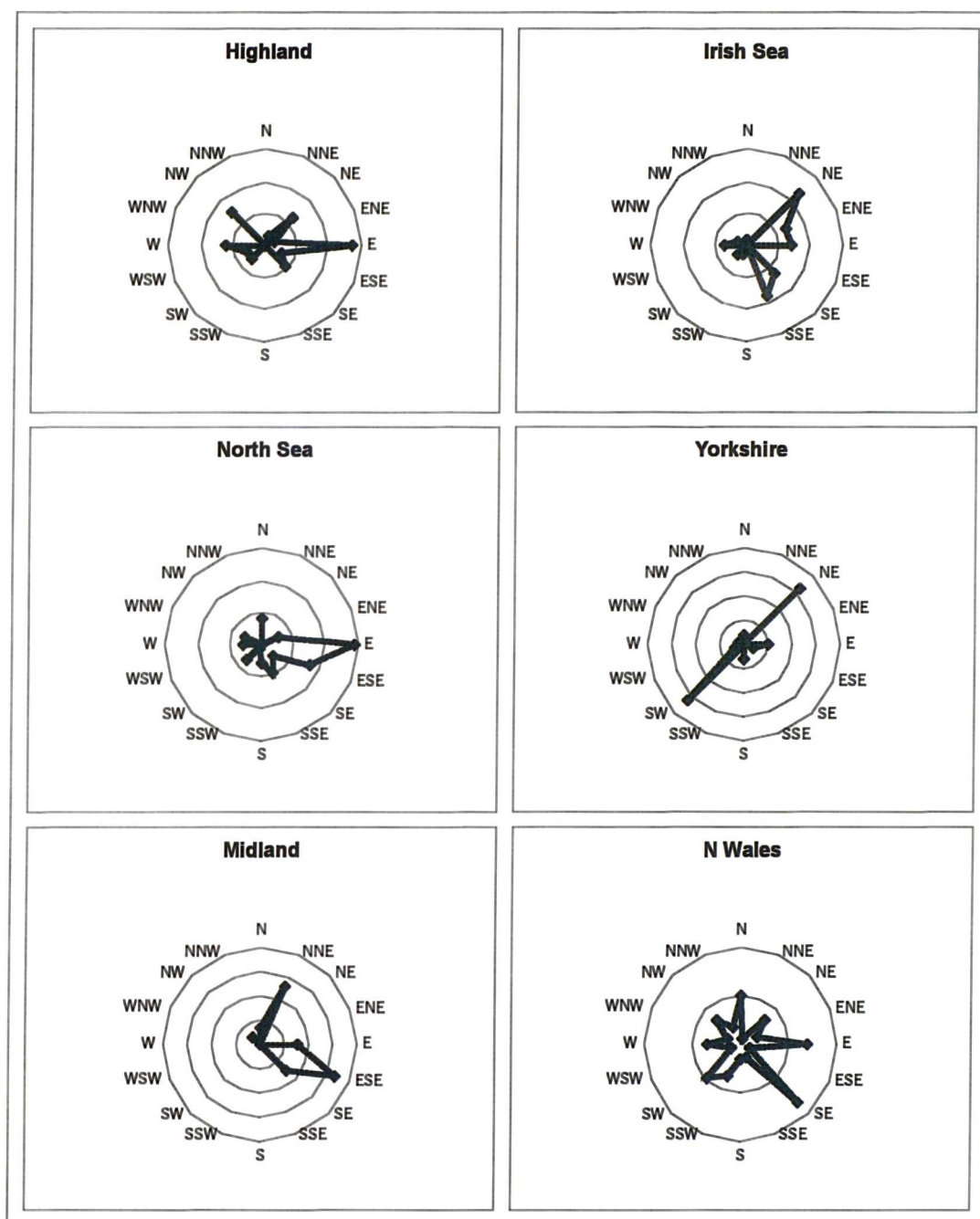


Fig 5.62 Regional variation in enclosure orientation in north and central Britain

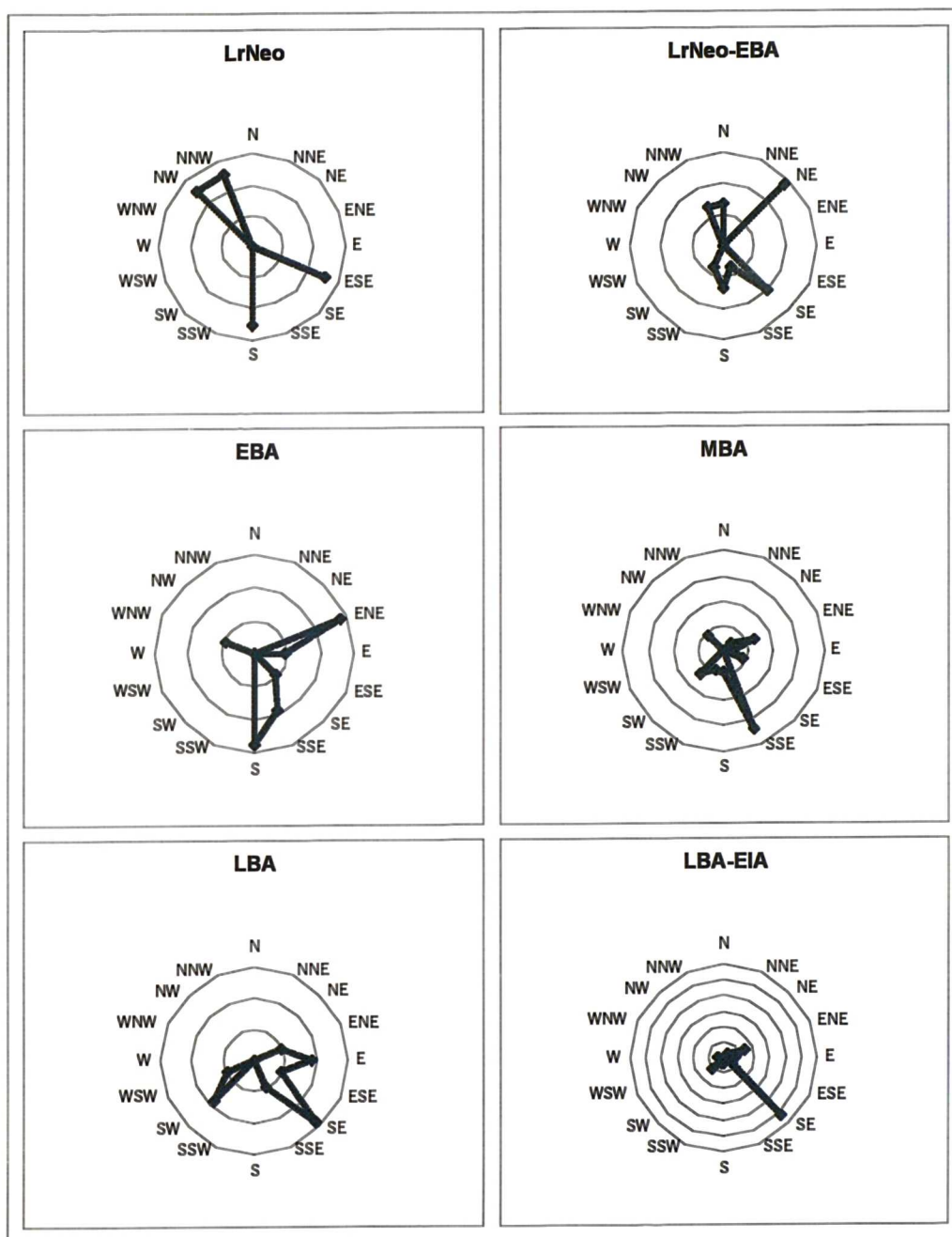


Fig 5.63 Chronological variation in structure orientation in north and central Britain

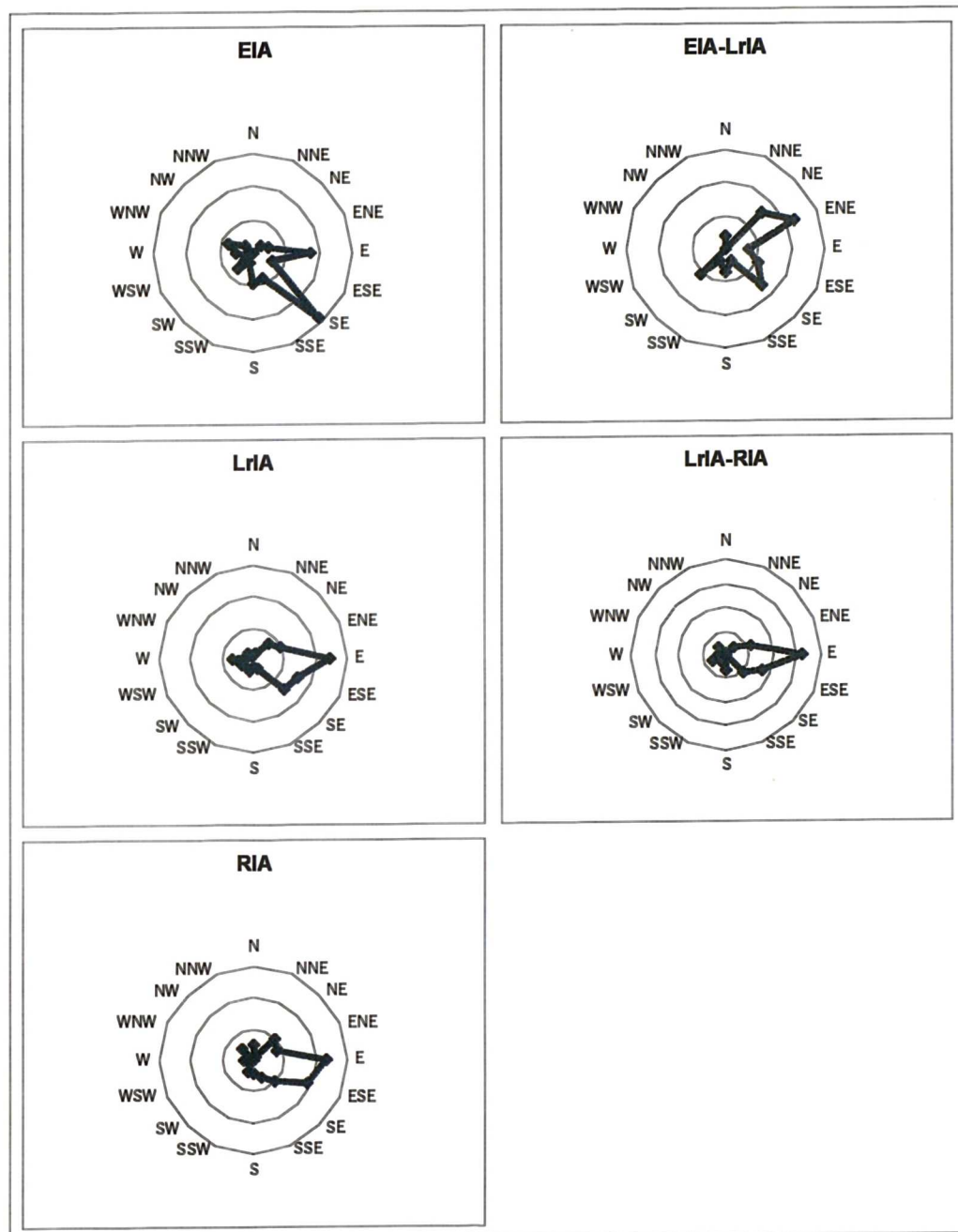


Fig 5.63 continued

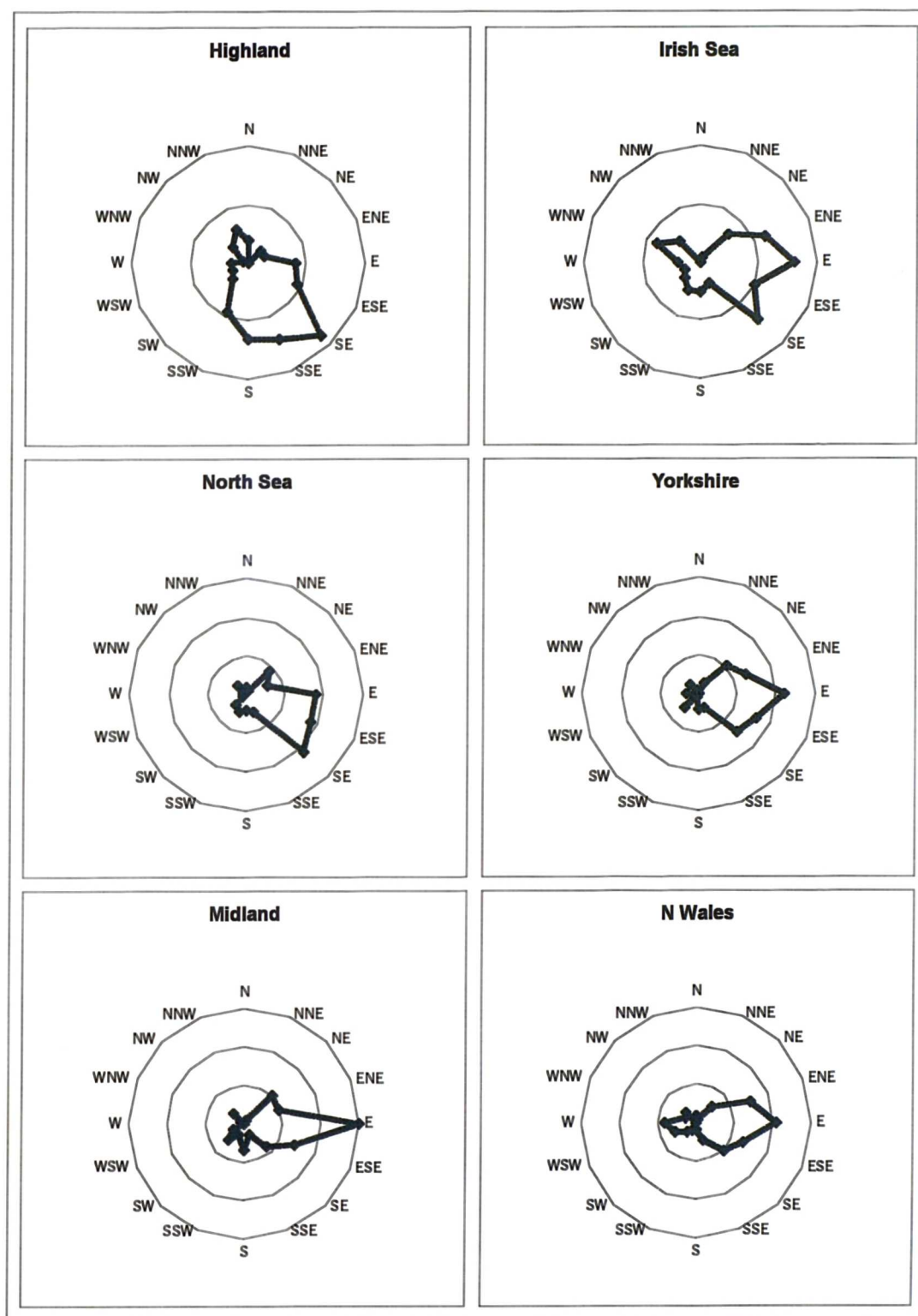


Fig 5.64 Regional variation in structure orientation in north and central Britain

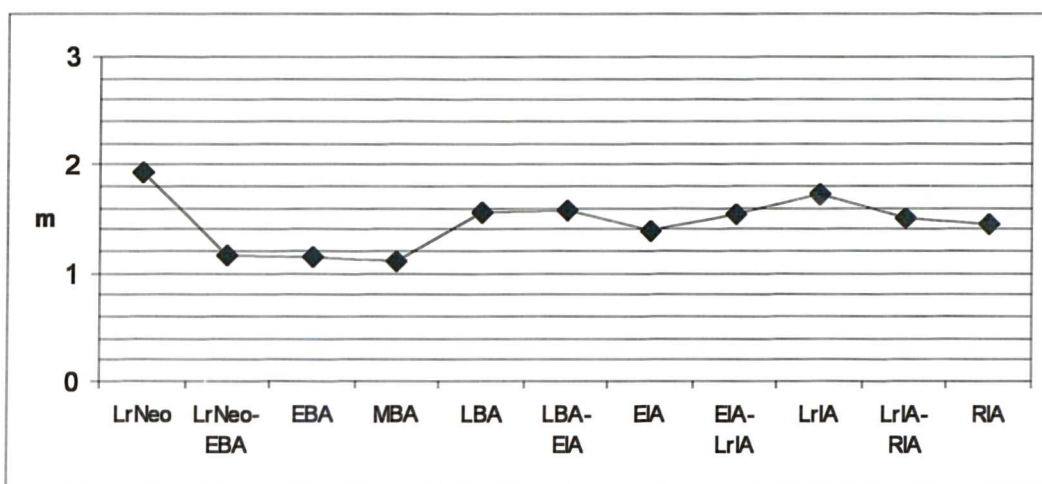


Fig 5.65 Chronological variation in door width

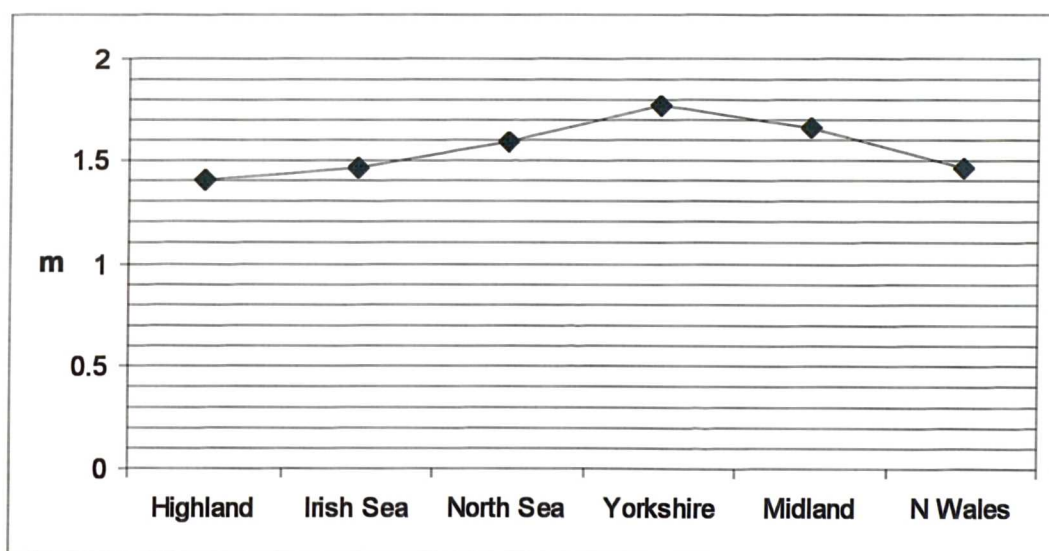


Fig 5.66 Regional variation in door width

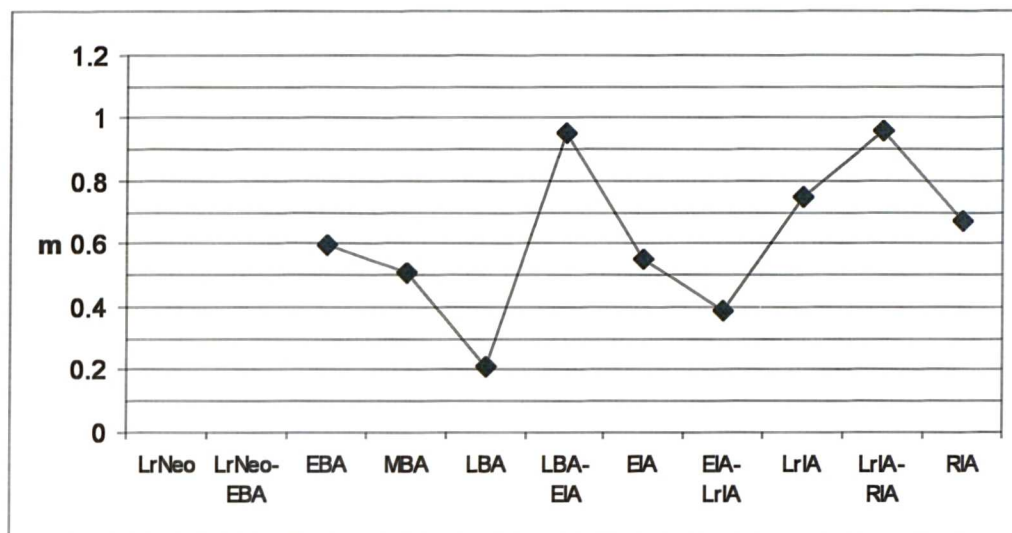


Fig 5.67 Chronological variation in stone wall height

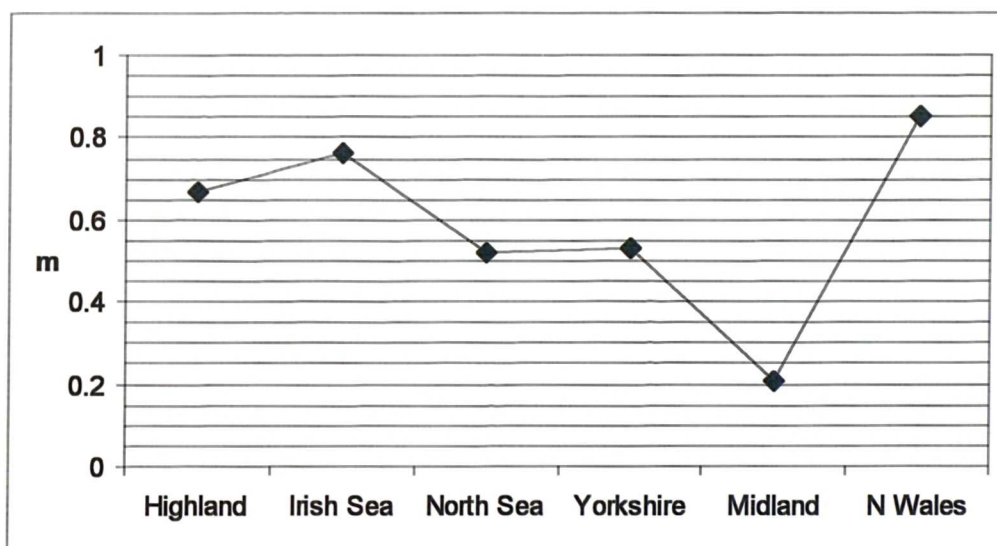


Fig 5.68 Regional variation in stone wall height

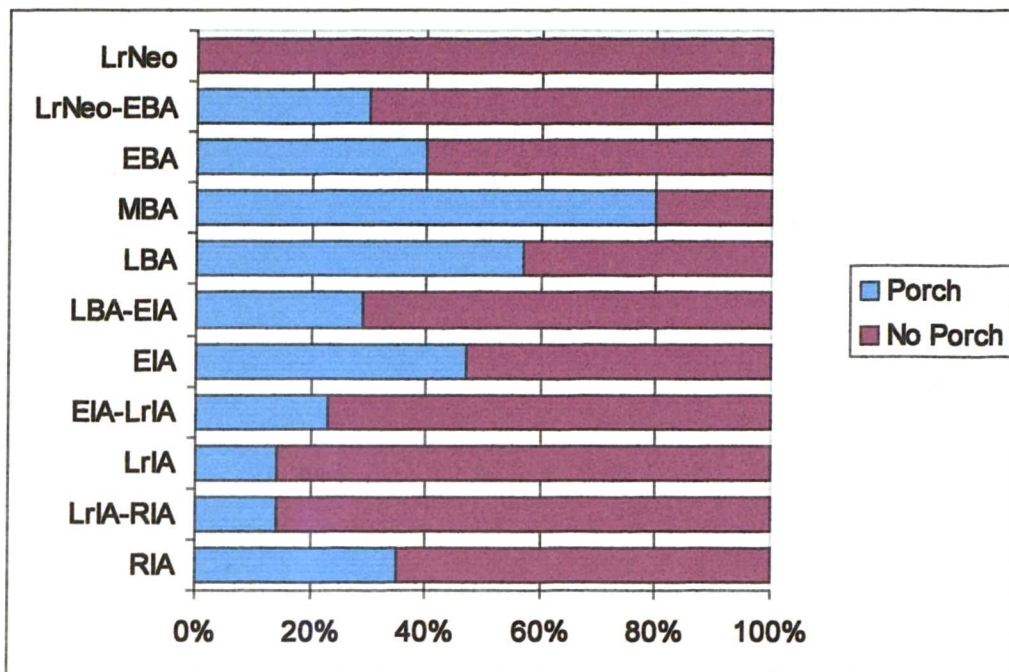


Fig 5.69 Chronological variation in the provision of a porch

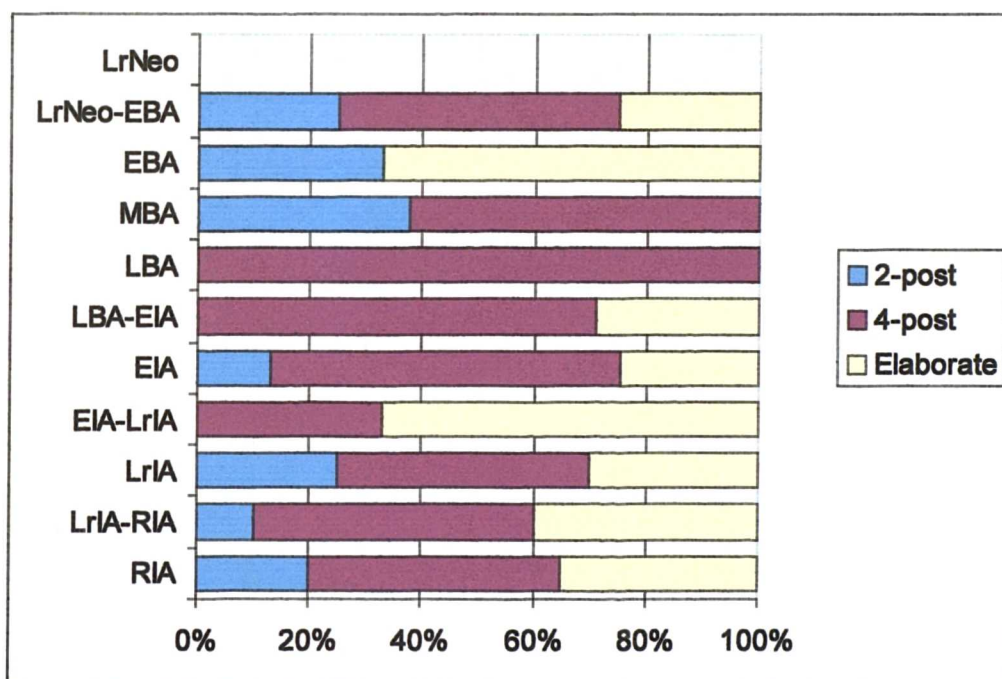


Fig 5.70 Chronological variation in porch type

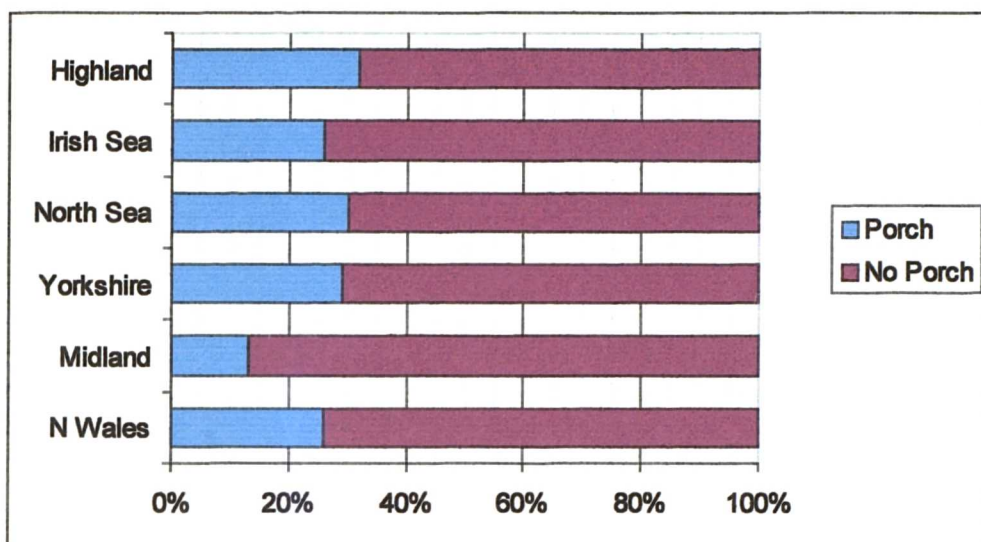


Fig 5.71 Regional variation in the provision of a porch

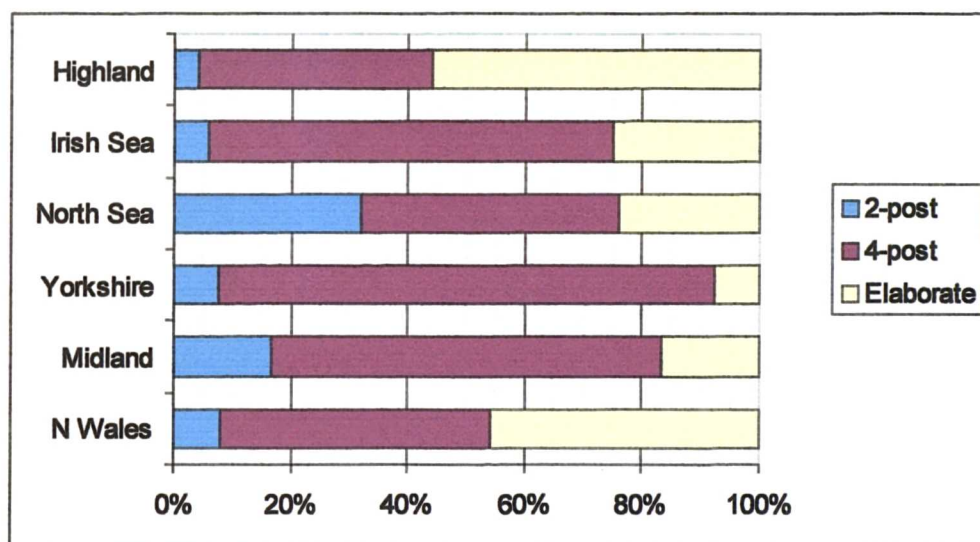


Fig 5.72 Regional variation in porch type

Chapter 6 Structure Use

"full knowledge of the inner arrangement of these houses will only be worked out through the cumulative use of partial information from many sites"

(Bersu 1977, 58)

6.1 Introduction

Archaeologists studying roundhouses have been criticised for basing too much emphasis on structural concerns and the physical properties of prehistoric structures whilst not attempting to analyse them regarding their function and spatial arrangements (Reid 1989, 6). Where these topics have been tackled in more recent years, it has been without recourse to the wider dataset; all too often conclusions regarding prehistoric use of space have been drawn from a handful of what might in many respects be considered to be unrepresentative sites. This chapter will summarise the current evidence for structure use in northern and central Britain. Internal features will be examined first, followed by use of space and finally structure function.

6.2 Internal Features

6.2.1 Hearths and Working Surfaces

Hearths

Hearth type is known in 303 structures; most common is the use of slabs, pit hearths and hearth stones (fig. 6.1). The hearth setting has two main tasks: containing the fire and retaining its heat. Hearthstones also serve to balance the base of cooking pots. One in six structures have an external hearth but the vast majority are internal (fig. 6.2). A hearth provides heat, light, and a cooking facility and may also be used in craft production. At the first *Glastonbury House* the natural temperature inside the structure was 4°C higher than that outside. In the first *Conderton House*, the central hearth could raise the temperature to 20°C within an hour (Reynolds 1967; forthcoming). Hot air rising from the hearth draws a current of cold air from the door, the smoke spirals into the roof space and percolates out through the thatch, keeping the lower part of the structure relatively smoke free (Orchardson & Matson 1961; Reynolds 1983; contra Walker 1987). Smoke from the fire limits thatch decay, discourages rodents and provides an attic environment ideal for curing meat and drying firewood (Gebremedhin 1971; Levin 1971; Reynolds 1983; Oliver 1987). Forty-six structures – of all periods and regions - have evidence for hearth furniture in the form of stakeholes or postholes around the hearth (e.g. fig. 6.4). These represent meat spits or frames for the suspension of pots. In a few cases, stakeholes appear to form a hearth screen and in just five cases a pit is associated with the hearth.

Two in five hearths have evidence for fuel type and the main wood types used are hazel, birch, alder, and willow (fig. 6.3). Burning green wood is a waste of wood energy, as a considerable amount of the heat generated is used in expelling moisture, however much green wood would be completely useless were it not used as fuel. Dry, dense wood has a high fuel value; charcoal even higher. Charcoal is lighter to transport than wood and easier to store: the advantages more than offsetting the cost of manufacture (Desch & Dinwoodie 1981, 206-207). Whilst we have, as yet, no evidence for the prehistoric practice of charcoal burning it remains a possibility (Bennett forthcoming). We do know, however, that coal was used at several settlements in the RIA period in the coal-rich regions of north Wales and north-east England (Gardner & Savory 1964; Jobey 1970; 1973a, Fairless & Coggins 1986). Other possibilities for fuel are dried dung, peat or bark but each has a high ash content - that of bark being four times greater than of wood (Aaron 1976, 27)¹⁸. In the *Pimperne House*, a wood fire burned in the hearth for 180 days of each year. After three years, the ash in the hearth setting - none of which had been removed - was just 0.20 m deep (Reynolds 1983, 188).

Following the removal of distorter sites, 38% of structures have no evidence for a hearth; slightly more than one in three. No relationship was found with height above sea level (fig. 6.5) and only in the very largest structures is a hearth more likely (fig. 6.6). Regarding choice of slope, structures with no hearth were more likely to be positioned on slopes which caught the morning sun in summer than in winter (fig. 6.7) and those structures without a hearth tended to have less variation around the functional optimum than did structures with a hearth (fig. 6.8). Structures with an internal hearth revealed orientation indicative of year-round occupation (fig. 6.9). Those with external hearths revealed orientation indicative of spring-autumn occupation and those with both suggested summer and winter occupation. Those artefacts more likely to be found in a structure without a hearth include hunting equipment and fineware, implying either storage in ancillary structures or the activities of seasonal structures (figs 6.10-6.11). Those activities more likely to take place in structures without hearths are bone- and antler-working, shale-working, spinning, non-ferrous metalworking, grain processing, and the stalling of livestock. The first three - each being fairly mobile - might be seen as summer activities; the latter three as those taking place in ancillary structures. In summary, structures without hearths might be seen as ancillary or seasonal structures.

Working Surfaces

Nine structures have flat-topped boulder working surfaces, a further two utilise outcrop within the structure. These features are generally found in structures of Iron Age and RIA date in Highland Scotland, North Sea, and north Wales. Alcock (1960) suggested that they may have

¹⁸ In addition, the distinctive peat ash deposits of Atlantic roundhouses are absent in this dataset.

been used for activities such as the kneading of dough which requires a cool surface. Eleven structures – of all dates and regions - use stone slabs as working surfaces. Seven of these are directly associated with the hearth and are of predominantly LrIA-RIA date from the Irish Sea and North Sea regions. Such surfaces were presumably used in the preparation and cooking of food. A further three RIA structures utilise a boulder as a mortar. Three LrIA structures are provided with anvil stones - two of these are at the LrIA metalworking site of Crawcwellt West (Gwynedd) another at Balevullin on Tíree (MacKie 1963-64). It is presumed that the majority of structures utilised the surfaces provided by wooden furniture.

6.2.2 Flooring, Ring-Ditches, Drains

Flooring

The vast majority of structures have no evidence for flooring (fig. 6.12). We might envisage that these structures utilised a natural earth floor, as is often suggested by the excavator. As late as the 1920s, for example, some slum dwellings in Stirling still had soil floors. Vegetation – such as straw, heather or bark - may have covered a soil floor. Bark, in particular, has the ability to absorb ammonia and minimise foul odours and can be used as a deep litter for livestock (Aaron 1976, 26). It is possible, however that plank flooring was provided, perhaps arranged radially out from the central fire. Considering the skill involved in prehistoric timber construction such a floor would not be difficult to envisage. One in ten structures reveal the practice of *dual-flooring* where only a specific part of the structure is apparently floored – usually paved – whilst the rest is usually of earth (or decayed wood flooring). Dual flooring appears to be a genuine prehistoric practice and not an accident of survival: of those with dual flooring, 33% had suffered robbing and/or plough damage; slightly *less* than the 35% for the dataset as a whole. Thirty structures were floored – generally with stone - only at their entrance. The greatest use of dual flooring sees an annular division of space – presumably reflecting the reasonably common practice of paving the periphery (fig. 6.13). Discrete areas of paving were most commonly associated with the hearth. Paving and cobbling of the whole floor is predominantly a LrIA-RIA practice and is generally associated with stone-built structures. The majority of made floors were described as of clay, stone and earth, or beaten earth. Such essentially mud floors can be quite smooth and if beaten whilst setting can be as hard as cement (Denyer 1978, 94).

115 structures (10%) have evidence for what have come to be known as 'occupation deposits'. It is traditionally assumed that these deposits formed during the use of the structure but such a view now tends to be considered simplistic and lacking in an understanding of formation processes (Matthews 1993). Such a deposit consists of an homogenous dark or black soil with very small, fragmentary bits of charcoal, burnt bone and occasionally ceramics. In beaten earth floors mud is mixed with charcoal or other small aggregate; or with cow dung and then smeared

with ashes. Ceramic inclusions might reveal the aggregate component of a beaten earth floor in some cases, the charcoal and fragments of burnt bone resulting from the practice of spreading the floor with ashes from the hearth. The dark colour of the soil also implies a high humus content. If 'occupation soil' forms during the post-abandonment period it might also incorporate vegetation from the floor - or thatch from the roof. The homogenisation of the deposit presumably follows the effects of worm and water action inside the roofless structure (cf. Atkinson 1957); the latter in particular accounting for the highly fragmentary nature of the bone and ceramic material. Around 50% of 'occupation deposits' also contain finds and the results of a finds analysis suggest that such deposits are likely to include the decayed accumulation of secondary refuse in the abandonment and post-abandonment period (see 8.2.2).

Ring-Ditches

A ring-ditch is a heavily worn wear-gully generally found in the periphery of larger - an average diameter of 11 m - timber-built or mass-walled structures. Current data suggests that the average width of a ring-ditch is 2.2 m and depth 0.47 m - although a much more substantial example is known from Douglasmuir CS 6 where the steep outer profile of the feature appears to have been cut rather than worn, perhaps as a secondary event. The average area of the periphery in these structures is 57 sq. m: 16% above average. In most, the gully takes the form of a series of scoops and at a late stage in its use the gully is generally provided with stone infill and/or paving, sometimes associated with the deposition of (inverted) quernstones (Pope forthcoming b). Only one in three are provided with a hearth. Around forty-five ring-ditch structures have now been excavated at seventeen sites (fig. 6.14) and their date generally spans the late 2nd millennium BC to the early first millennium AD: much broader than the mid 1st millennium BC date given by Hill (1982a). Earlier examples are also now known. Fourteen ring-ditch structures have been recently excavated at Kintore in Aberdeenshire (Alexander 1996a; Cook 2001) and a further four are undergoing excavation at Birnie in Moray (Hunter 2002). Halliday (1985) has suggested that the stone-built Dalrulzion-type houses of Perthshire may be related to ring-ditch structures. This is perhaps confirmed by excavations at Carn Dubh where the intra-mural space was described as having been 'churned up' (Rideout 1995).

Early commentators believed the ditch to be external to the structure and used for drainage (Stevenson 1948-49; Feachem 1965). However at High Knowes A it was revealed that the ring-ditch was actually internal (Jobey & Tait 1966). Guilbert (1983) reinterpreted Braidwood accordingly and noted that at both Braidwood and High Knowes the scoops respected the structural postholes (fig. 6.15). Kendrick (1982) suggested the feature may have been deliberately created to increase headroom at the wall or that the deep example at Douglasmuir CS 6 may be seen as an early version of the soubterrain. However it is more widely accepted that the ring-ditch was a feature of heavy wear perhaps created by the overwintering of livestock

(Jobey & Tait 1966; Reynolds 1982). Reid (1989) recognised that the scoops were an indication of the use of radial divisions as found at Aldclune 2 (Hingley *et al.* 1997) and parallels have been drawn with the bays of a wheelhouse (Jobey & Tait 1966; Kendrick 1995). Cattle bones are dominant at Broxmouth - as in much of Tyne-Forth (Hambleton 1999) - and it was suggested that as many as thirty cattle might be stalled in such a structure (Reynolds 1982). All types of landscape location are represented, however, and the stalling of sheep and goats must also be considered. The orientation of the scoops suggests that rather than facing into the structure, animals were perhaps stalled circumferentially (contra Jobey & Tait 1966). Phosphate evidence from Beckton Farm and Culhawk Hill led the excavators to believe that the ring-ditch had been kept clean. At Ironshill a brown soil in the ring-ditch was interpreted as decayed manure and litter layers were apparently identified at High Knowes with higher phosphate levels in the periphery at Lintshie Gutter.

Drains

Internal drains are present in forty-six structures. These features are generally LrIA-RIA in date and present in all regions bar the Midland Plain but predominantly associated with the stone-built structures of north Wales. The feature generally runs around the periphery of the structure and out either through the door or under the wall. The feature is generally slab-covered and occasionally lined (fig. 6.16). This feature may represent the less careful siting of structures regarding the provision of natural drainage or may reveal an improved way of cleaning out byre structures.

6.2.3 Partitions & Furniture

Postholes

Around one in five structures has internal postholes and less than five features is by far the norm (fig. 6.17). Of those with just one posthole, three in five (61%) were in the form of a central post: a total of thirty-five structures. The central post may have acted as an aid in construction - a way of stabilising the apex - or may have housed a non-structural feature. Of those with two postholes, one in four (13 structures) were in the form of a posthole pair which could reveal any type of internal feature based on two uprights. Of these, just four might plausibly be interpreted as the position of a loom (table 6.1). Two additional pairs were identified at Myrehead CS 3 and a furnace was also present in the Rampton structure. This low number might indicate that the prehistoric loom was rarely founded but was instead leaned against the wall as suggested by Britnell (1977).

	CS	Region	Date	Distance Apart	Position	Reference
Standrop Rigg	2	North Sea	LBA	0.7 m	FC	Jobey 1983
Myrehead	3	Highland	LBA-EIA	0.8 m	FL	Barclay 1983
Swarkestone Lowes	P-R	Yorkshire	LBA-EIA	1.4 m	FR	Guilbert & Elliott 1999
Rampton	1	Midland	LrIA	3.5 m	FL	Ponsford 1992

Table 6.1 Potential loom arrangements in north and central Britain

Internal posts might serve a variety of functions - what Guilbert (1983) eloquently refers to as: 'the casual erection of uprights for a myriad of mundane purposes' – such as tying posts, stands etc. Internal posts are more than 30% more likely where the structure has undergone structural repair and as such, some may provide additional roof props. One feature which is common in the ethnographic literature is the provision of a freestanding, raised platform. In the Gurage house such a feature is used for storage and the posts double as cattle-tying posts (Gebremedhin 1971). Alternatively they might function as raised beds such as in the traditional Kipsigis house where such a platform is positioned above the fireplace to maximise heat and deter ill-health (Orchardson & Matson 1961). This is perhaps most likely where a square of posts can be elucidated and this is only the case in six structures.

Partitions

Individual posts might also provide the end to an otherwise unfounded partition such as a raised hurdle. Fig. 6.17 reveals that in thirty structures a number of stakes were provided and that their number tends to exceed that of posts. It is suggested that, whilst a small number of stakes might serve some of the purposes discussed above regarding postholes, where a high number of stakeholes is found these imply the use of stake-built partitions within the structure. Very high numbers of stakeholes are often found in structures associated with metalworking activities and this is considered to be a result of the need for light controlling measures (A. Heald pers. comm.). Ethnographically, partitions have three main purposes: to separate livestock from the human inhabitants, to conceal storage areas and to provide privacy and extra insulation for sleeping areas. Nevertheless, two in three structures revealed no evidence for the use of internal partitions and whilst in some cases this may be the result of plough damage, we can safely assume that the majority of structures went without. As well as restricting access, partitions can hinder ventilation (Oliver 1987, 130).

Structures with clear evidence for the use of internal partitions totalled 103 (15% of those with suitable data); possible partitions exist in a further 129 structures. Fig. 6.18 shows partition type, with radial divisions slightly more popular and preferable to entrance partitions presumably as the latter restrict light. Partitions are more common in lower-lying structures (fig. 6.19). It was found that radial partitions are most popular on hillslope structures - particularly in those on the upper slopes - but are not used in the uplands where annular division is most common (fig.

6.20). Partitions are more popular in structures sited on south-east facing slopes which suggests that they may be associated with winter activities (fig. 6.21). Evidence from structure orientation seems to indicate use during autumn or spring (fig. 6.22). Those without partitions may be more likely to be utilised in the winter months. Partitions are slightly more popular in structures between 8-11 m in diameter (fig. 6.23). Regarding partition type, smaller structures are more likely to have chordal partitions and this perhaps reflects the popularity of a chordal bed arrangement in LtIA-RIA stone structures of the North Sea and north Wales regions (fig. 6.24). Radial division is clearly most commonly found in larger structures (> 11 m in diameter) but this is not exclusive (fig. 6.25).

Beds and Seating

In the ethnographic literature, beds are of two basic forms: a raised wooden platform or a low platform of clay. The latter has a prehistoric counterpart in 25 structures. These are the 0.10-0.25 m high 'benches' which constitute a raised chordal area - usually at the rear of the structure - occasionally separated off by a stake screen and made of stone or turf, with some examples quarried out of bedrock (fig. 6.26). This feature is present in all areas – bar the Midland Plain – but is most popular in the LtIA-RIA stone structures of North Sea and north Wales. It does not usually occur in Bronze Age structures. Whilst raised timber platform beds are a possibility the evidence for this is limited. Ground level timber beds may have been more commonly used and as unfounded would remain archaeologically invisible. At the *Greenbogs House* the bed area was set in the periphery, defined at either end by a partition and at the front by a tree trunk. The bedding comprised a layer of branches and sticks covered by a bed of straw, the former stopping the straw from turning to compost (H. Murray pers. comm.). The whole was 0.20 m deep and was found to be extremely comfortable. At the well-preserved South Shields house, bedding material comprised bracken, heather and culm nodes from grain processing (van der Veen 2001). In the case of the Kipsigis, many sleep in the attic/loft and this is a further possibility – perhaps that most preferred by the current author – particularly in double-ring structures. At the *Greenbogs House*, seating around the fire was provided by sections of tree trunk. Additional furniture could easily be made from split timbers held together with pegged joints.

6.2.4 Pits and Alcoves

Perhaps as many as one in three structures is provided with an internal pit or pits but only 18% of sites had definite evidence. The majority of these have just one or perhaps two pits (fig. 6.27) and the average depth is c. 0.24 m. Thirty-two (8%) have a clay- or stone-lining or are described as basins and reveal that at least one in thirteen was used for the storage of water: perhaps for storage or to function as cooking-pits. Other pits, however, may have had a wooden or wickerwork lining (Bersu 1977; Fairless & Coggins 1986). As well as use for water storage and

cooking, pits may have been used for the cold storage of foodstuffs. At Dragonby, insect remains from a LtIA-RIA wicker-lined pit-well revealed that it had been used a watering hole for animals (May 1996). Presumably a pit would have been supplied with a wooden cover when not in use. Five per cent were described as hollows and these may have held upright vessels stable for activities involved in food processing. Some structures also had pits provided immediately external to the structure (fig. 6.28). Thirteen structures – predominantly IA and RIA in date and from all areas bar the Midland Plain – have alcoves in their walls. Where dimensions can be ascertained they are between *c.* 0.2-0.4 m in each direction but examples at Milking Gap were 0.8 m and 1.5 m long respectively. Such alcoves might provide an area for storage as is often assumed (Fairless & Coggins 1986; Rideout 1992) but an alternative suggestion, particularly apt for smaller examples, is their use as ledges or shelves for lamps.

6.3 Use of Space

This section begins with a discussion of previous work on the prehistoric use of space, and finds that the main model proposed by recent studies is problematic. An alternative understanding was therefore sought. Ethnoarchaeological studies indicate that most abandonment of structures is planned and as a result house floor assemblages are generally unreliable for identifying use patterns (see 8.2). Since very few structures reveal accidental destruction, gaining an understanding of use of space is not straightforward. As a result it was decided to analyse all evidence potentially relevant to use of space: topics covered include hearth position; distribution of finds, pits, partitions; lighting; the provision of peripheral, central and attic/loft space, as well as the use of external space.

6.3.1 Internal Space

Following Hill's (1984) paper on structural principles (see 4.3.2), Reid (1989) introduced the idea that use of space was of potentially greater importance in roundhouse design than principles of structural engineering. Unfortunately, Reid chose to dismiss structural principles altogether suggesting that if prehistoric builders had knowledge of a structural optimum then we would find only uniformly large roundhouses in the archaeological record. In his eagerness to reject what he mistakenly believes to be functionalist thought, Reid himself displays a tendency towards efficiency values and an understanding of prehistoric society as essentially primitive. The optimum ratio is a basic engineering principle – one easily learned over generations of construction activity as, even in prehistory, a structure was party to the laws of physics and the forces of gravity. The optimum ratio is simply a norm with which we can test the archaeological data. Despite the flaws in Reid's argument, his ideas regarding the important role of the use of space in house design had been successfully introduced.

In Hill's (1984) dataset of 43 structures – most of them from the Tyne-Forth province - the results appeared to suggest a standardisation in the provision of peripheral space: with more created in smaller structures and less in larger structures. Reid (1989) plotted the dimensions of twenty-two double-ring roundhouses – most of them ring-ditch structures - from Tyne-Forth and found that 82% had their outer walls and inner-rings positioned further apart than the optimum. For Tyne-Forth then, Reid's idea regarding space influencing design was valid and seemed to suggest that it was the periphery, rather than the centre, which held the greater influence over structure design. Using a dataset of 270 double-ring structures from across northern and central Britain, the spread around the structural optimum means that it can be confidently stated that whilst there was a *general* respect for the structural optimum, both structural and spatial concerns were considered on structure design (figs 4.43, 6.29). It was also observed that double-ring structures do tend to have a larger periphery. This may reveal its use for an activity of requiring a set width i.e. radial beds or stalls. In triple-ring structures, the periphery tends to respect the structural optimum (fig. 4.47), however the central space was generally smaller thus increasing the size of the inner zone (fig. 4.48, 6.29). This might accord well with evidence from High Knowes A CS 1 and Braidwood CS 1 where the inner zone, as well as the periphery, revealed activities associated with the formation of a ring-ditch (fig. 6.15).

Hingley's (1990) attempt to engender the roundhouse by using structuralist theory to associate women with peripheral space and, amongst other things, the concepts of darkness, dirt, rawness, infertility and death can surely be rejected as a somewhat disturbing modern male view of prehistoric woman (see also 2.3.3). More useful was his idea that double-ring structures have two major functional areas: the central space with the hearth, the focus of communal domestic activity; and the periphery for sleeping and storage. However the structuralist emphasis on the active centre and inert periphery does not accord well with wear patterns in the archaeological record which suggest that, in many double-ring structures, the periphery was a dynamic area, most likely associated with the stalling of animals. Using a dataset of 43 structures, Strang (1991) found that the vast majority of structures had a 1-2 m wide periphery. This is confirmed using a larger dataset with the average periphery being 1.7 m wide (fig. 6.30). In T-R structures the width of the inner zone is very similar to that of the periphery at 1.8 m. Contrary to what might be expected, the area of the periphery is, on average, larger than the central area (table 6.2). In a 10 m structure built to the structural optimum the central area represents 38% of the total space; the periphery 62%. When compared with the mean figures in table 6.2, this again reveals there to be a *general* respect for the structural norm in prehistoric architecture.

	Centre	Periphery	Inner Zone
Mean Area (sq. m)	31	48	41

Table 6.2 Mean area of annular spaces in circular structures

Adapted from the work of Richards (1990) on Neolithic Orkney¹⁹, an idea has been put forward in later prehistoric studies which suggests that life inside the prehistoric roundhouse was ritually structured around a light, activity-based southern side and a dark, northern side which was used for sleeping and storage (Parker Pearson & Richards 1994; Fitzpatrick 1994; 1997; Oswald 1997; Parker Pearson 1996; 1999; Parker Pearson & Sharples 1999). The idea is that sun-based belief systems dictated movement within the structure: people would work in the south of the structure when the sun is in the southern sky and sleep in the north side when the sun was (invisible) in the northern sky (Parker Pearson & Sharples 1999, 21). However, this cosmological model (fig. 6.31) can be categorically rejected on a variety of levels (see 2.3.2; 5.2.3) including its application of formal ethnographic analogy, reliance on a distorted orientation dataset, and a basic misunderstanding of how light works within a circular structure. The developed model has no basis in a wider analysis of the archaeological data as the remainder of this section will show, although Fitzpatrick's (1994) original observations regarding spatial patterning at the sites of Dunston Park and Longbridge Deverill Cow Down should continue to be considered.

Essentially, Iron Age studies have seen the wholesale adoption of sunwise traditions and ritualised use of space from the Navajo hogan and the *yurt* of the Turkomen, Uzbeks, and Kirghiz of Afghanistan; the Russian Kazaks; and a number of Mongolian tribes (fig. 6.32). For these communities belief systems involve the practice of animism which is used to explain natural phenomena. Bound up with an oral history of the community the dwelling readily becomes the symbolic model of the greater universe and is transmitted through the generations as cultural tradition (Oliver 1987, 158-160). In the house a sunwise path is followed; space is divided according to biological sex and status; and the transition from exterior to interior is symbolically important. The current author suggests that such practices are developed by nomadic communities as a way of creating ontological security for a group which has only short-term ties with its landscape. Such overtly ritual segregation of the house is not so frequently found in traditional African roundhouses and it is strongly advised that the application of formal ethnographic analogy of the type seen in recent discussions of the prehistoric use of space are actively discouraged in future studies (see 2.3).

6.3.2 Spatial Patterning

It is commonly suggested that use of space is determined by the provision of light (Reid 1993, 61). Figs 6.33-6.34 show how light falls in a circular structure. A gap at the top of the wall – protected by the eaves – provides light in the early morning before the door is open. The door is

¹⁹ Stemming originally from the ideas of Childe (1931) at Skara Brae.

the main light source during the day²⁰ and the best light is therefore found towards the front of the structure with light levels decreasing towards the rear. Sunlight shifts from the left to the right of the structure throughout the morning and disappears before noon. As day progresses, light begins to withdraw from the periphery until by evening, the central fire has become the focus of activity. Stone lamps, utilising animal fat or butter as fuel, might provide additional pockets of light. In winter there is a greater emphasis on the central fire as the door is increasingly kept shut against the cold. At Archaeolink, a SW-facing 1 m wide door – 33% narrower than the prehistoric average – provided ample light in the morning even when just half open. At the first *Conderton House* it was possible to use a loom in the CL area of the north-facing structure and even to weave non-patterned cloth with only the light from the central fire (Reynolds forthcoming, 226). Our eyes do adjust to the amount of light available and in time one becomes able to work in low light levels (H. Murray pers. comm.). In these conditions we rely more on our sense of touch and the repetitive actions of the hands.

At South Shields, van der Veen (2001) commented that the lack of plant remains around the hearth must imply that activities took place there which prevented their accumulation. At the Archaeolink house, this is an area where moveable seating is placed. The hearth is a major area of activity because of its heating and lighting qualities. In traditional African circular structures a centre-periphery division of space is common with activity taking place around the central hearth and furniture arranged around the periphery of the structure (Andersen 1978, 66; 210). It is commonly suggested that the darker peripheral space in prehistoric structures was used for sleeping and storing equipment, food and firewood as well as stalling domesticated animals (Musson 1970a; Harding 1974; Chadwick Hawkes 1994). In a study of MBA structures in southern England, Brück (1999b) found that pits were predominantly located in the periphery and at late Neolithic Barnhouse on Orkney the distribution of large vessels around the periphery again suggests its use for storage (Andy Jones pers. comm.). We might begin to think of the periphery as of greater importance than the centre in some ways. At Greaves Ash, for example, more care was taken in the paving of the periphery than with that of the centre (Tate 1861).

Fig 6.35 shows the division of space used in spatial analyses. Where hearth position was known (308 structures), 42% were found to have a central hearth with a further 11% positioned slightly forward of centre (fig. 6.36). The typical central position of the prehistoric hearth reveals the need for an even distribution of heat and light within the structure. In African traditional architecture the hearth is often non-central, more often positioned in the area designated for cooking. In prehistoric Britain, however, hearth position was determined more by the environmental concerns associated with living in a temperate climate. The central position of

²⁰ The low wall height of most structures makes windows unlikely. Whilst flaps in the roof are found in African architecture it is suggested that such features would prove unsuitable in a precipitous climate.

the hearth also reduces the risk of fire as it is positioned beneath the apex – the highest part of the roof. In prehistoric longhouses in Denmark, where the hearth is positioned towards the gable end, the evidence for accidental destruction by fire is substantially greater than in Britain (Leo Webley pers. comm.). In Luo houses both centre-periphery and front-rear division of space can be seen: a similar duality to that being revealed in the prehistoric evidence. For the Luo, peripheral space is divided off from the central living/sleeping space. The rear periphery is used for storage; and the front periphery – to the left of the entrance – for animal stalling with cooking taking place to the right (Andersen 1978, 139-141).

Front-rear division of space is also common in the ethnographic literature, for example in the houses of the Dorze, Kipsigis, and Galla (table 3.2). The rear is generally used for sleeping or storage, with the front especially involved in cooking and social activities (Gebremedhin 1971; Andersen 1978, 95; 157). Whilst the front has the advantages of light and ease of access, the rear has the potential to be a more private area. Recent work on longhouses in LrIA Denmark has also revealed a front-rear division about the hearth (Webley forthcoming). In the current dataset, finds and pits – taken as evidence for the position of internal activities – are most commonly found at the front of the structure with some preference for the rear (figs 6.37-6.38). Pits are often not associated with hearths proving the use of each to be, on the whole, mutually exclusive (fig. 6.39). Some pits presumably represent inert storage whilst others reveal activity associated with water. Regarding distribution of finds it must be remembered that they may have as much to do with deposition on abandonment as with structure use. At Tormore CS 10/1, more posthole-producing activity was found in the area immediately adjacent to the doorway along with evidence for crop- and wood-processing activities and a concentration of lithics, whilst evidence for the storage of wood and grain was found in the rear (Barber 1997, 11).

The evidence from patterning in dual flooring (104 structures) reveal that whilst the majority of structures have flooring based around a centre:periphery division of space, there is also a strong trend for a division based on front:rear (fig. 6.40). The spatial patterning of hearths, pits and finds is shown graphically in fig. 6.41. This reveals that most household activities were generally focused on the front of the structure. Other activities would focus around the central hearth as well as to the rear and rear right of the structure. The well-preserved site of South Shields reveals the real complexity of the prehistoric use of space and works against the division of space proposed by the cosmological model (figs 6.42-6.43)²¹. Instead when all the evidence is considered most activity appears to be taking place at the front of the structure with sleeping in the rear. A further emphasis lies on the centre of the structure, around the hearth with discrete areas of storage in the periphery (fig. 6.43). In those structures which reveal increased activity

²¹ Following comments on the draft text by the current author, the excavator desisted from his initial desire to make the evidence fit the cosmological model. This is not acknowledged in the final report.

on the southern side of the structure e.g. at Bridge House this may reveal a preference for conducting activities in the sunlight of early morning.

6.3.3 Storage Space

In prehistory, storage is traditionally seen as taking place in pits, pots and in alcoves or ancillary structures. For the Pokot, storage racks are suspended from the roof above the fire, and the baKosi suspend a drying rack from the floor of their attic. Both the Pokot and the Kuria have shelves made of a plastered framework of sticks and woven grass. Objects are also hung from pegs driven into the house walls (Andersen 1978, 122-124). The Luo suspend their pots from string bags hung from the rafters (*ibid*, 141). In the ethnographic literature surveyed (table 3.2), storage for one in two communities was accommodated by the provision of a full attic, partial loft or elevated rack. The traditional Kipsigis attic is an independent structure on four posts, as is that of the baKosi woman's house. The Kipsigis attic covers the whole area of the house and is entered by a square hole towards the rear of the structure. For the Kuria and Nandi an attic is supported on internal partitions. The Kikuyu supplement this arrangement with support from a few internal posts and whilst this is rare in prehistory it might be envisaged at Old Oswestry CS A Pd.1. Hot air rising from the fire means that the attic is warm and smoky and any food such as grain, meat or cheese that is stored there becomes disinfected and well-preserved (Oliver 1987; Orchardson & Matson 1961, 85). The initial storage of firewood takes place in the periphery for the baKosi and under the eaves for the Kikuyu. The baKosi then move their already-dry firewood into the attic so that it becomes blackened, making a very smooth-burning fuel (Levin 1971, 146).

Diana Reynolds (1982) first suggested the provision of an upper floor in prehistoric structures. In double-ring structures, between 20-30% of structure volume lies above the main ring-beam in the roof space and the main ring-beam itself provides the opportunity for the creation of an upper floor (fig. 6.44). In the average prehistoric structure provision of an attic/loft means that only c. 15 m³ of internal space is wasted (fig. 6.45). Providing a full attic or chordal loft also works to strengthen the structure by striking chords across the diameter (Reynolds 1983, 188). Table 4.1 (4.2.4) reveals that structures up to 9 m in diameter can be supported without an internal post-ring, nonetheless many 7-9 m diameter structures are provided with one. This has led to the identification of the prehistoric practice of overbuilding (4.3.4) however it may simply reveal the provision of supporting uprights for an upper floor. In 6 m diameter structures, perhaps the amount of space gained was not considered enough to warrant the addition of an upper floor or perhaps structures < 7 m in diameter were not utilised in such a way that an upper floor was required. In most double-ring structures the main ring-beam is positioned slightly higher than the optimum dictates, thus increasing peripheral space at the expense of attic/loft

space (fig. 6.29). In triple-ring structures, however, it is the inner zone that is widened whilst the main ring-beam is positioned at the optimum, thereby maximising attic/loft space. An upper floor would be used for sleeping and storage, evidence for the latter has recently been revealed at Lairg CS 4 (McCullagh & Tipping 1998). In simple-ring structures, it is believed that storage would take place in areas of the structure periphery (see above).

6.3.4 External Space

Despite the fact that the African climate allows the frequent use of external space, this topic is often ignored in ethnographic accounts of domestic space (Larsson 1989, 506). For the Tswana, however, the yard area provides an open kitchen; an area for the storage of building materials and feed; animal pens; a vegetable plot; a granary; a latrine shelter; and a washing area (Oliver 1987, 131). The use of external eaves-space however is well-recorded and the Kikuyu, for example, use the area to store firewood. In most Luo houses the wide eaves provide an external, veranda-type space which is used for domestic tasks. For the Luyia the deep eaves provide a shaded area outside the house and this is enclosed to either side of the entrance where it is used to grind flour (Andersen 1978, 133). A direct archaeological parallel for this was found at Moel y Gerddi (Kelly 1988a, 132). If the current author's reinterpretation of the Longbridge Deverill Cow Down house is accepted (see 4.2) the distribution of pottery suggests that what may now be seen as an external area between the house door and the gateway was one of active domestic activity. Alternatively it may reveal the position of domestic refuse outside the door to the house.

Most common in prehistory is the occurrence of boundaries such as fencelines or ditches, post-built rectilinear structures, followed by pits, and features associated with farming and craft activities (fig. 6.46). The use of boundaries implies the practice of mixed farming: an enclosure being used to either keep animals in or out, away from cropped land (Coggins & Fairless 1984). Evidence for outside cooking is relatively rare, even more so is evidence for upstanding waste disposal and whilst this may be a result of plough truncation it can be assumed that most waste was deposited in waste pits. It is also possible that organic material was removed to the fields to aid fertilisation of the soil. Ethnoarchaeology has revealed that the immediate external space is usually kept swept clean, creating a cleared 'arc' around the door with material accumulating against the structure wall, away from the door and in artefact traps such as drainage ditches (Rothschild 1991; Joyce & Johanessen 1993; Rothschild *et al.* 1993). Rothschild (1991) also found that formal refuse disposal tends to occur in front of a doorway but at a distance of *c.* 10 m. At the semi-abandoned houses of Zuni; domestic refuse was found at 15-25 m from the house whilst at the one still-occupied house the distance was reduced to 5-10 m (Rothschild *et al.* 1993, 132-136).

6.4 Structure Function

How do we get to an understanding of structure function? Few structures contain definitive internal features, for example the ubiquitous pit and posthole can serve a variety of functions. The idea that the provision or lack of post-ring symmetry might be an indicator of function was found wanting (Guilbert 1982, 76). Perhaps the main way is through an analysis of finds. However the archaeological assemblage is not necessarily representative of structure use when one considers the impact of regular cleaning, off-site waste disposal, and abandonment processes, or a change in function late in a structure's life. Nevertheless, it was felt that something must be attempted, if only to provide a baseline for future studies.

6.4.1 Domestic or Ancillary?

Analysis of the MBA settlement at Thorny Down (Wiltshire) characterised domestic structures as double-ring structures with strong finds patterning and evidence for food consumption, tool manufacture, textile production and other crafts. Ancillary structures were revealed as smaller structures with less marked finds patterning and evidence for food storage, preparation and cooking (Ellison 1987). A more general application by Brück (1999b) in southern England found that most MBA domestic structures combine a number of these functions. At Enderby a separate food production structure was argued for on the basis of finds of lots of butchered bone and also at Lintshie Gutter CS 5 where an oven was found (Meek 1997; Terry 1995a). However use of a separate structure for food production seems unlikely more generally. In LrIA Denmark the byrehouses contain evidence for food processing (including quern use), cooking and eating and activities involving whetstones and iron tools. Evidence for the storage of grain and food in ceramic vessels are more often found in the ancillary structure. Some ancillaries also function as smithies (Webley forthcoming).

Table 3.4 reveals those contexts most likely to reveal structure use. Of these, perhaps most secure is structural feature fills as a combination of post-end decay, sweeping and rodent activity means that finds are likely to enter these contexts during the life of the structure (Reynolds 1995). Unfortunately, an analysis of finds from structural feature fills also revealed the possibility of ritual deposition in these contexts (Appendix 4.3). As a result, 'odd deposits' have therefore been identified in *all* contexts potentially related to structure use (see also 8.2.2). The very identification of 'odd deposits' relies on our own understanding of what constitutes ritual (non-normative) practice. As such an analysis based on a selection of *apparently* normative finds is currently impossible (see 3.3.4). All things considered then, gaining a true understanding of structure function from finds is, at present, a somewhat difficult task. It was

thus decided to use *all* finds from those contexts most likely to reveal structure use and any conclusions drawn would have to bear the above factors in mind.

Figs 6.47-6.48 show the types of finds in circular structure contexts in northern and central Britain. The main find type is pottery²², followed by querns and rubbers, burnt bone, pot-boilers, flint, and jewellery. It has been shown elsewhere that quernstones and jewellery in particular were selected for deposition in foundation, re-use and particularly in abandonment practices. Pottery is a further possibility in these cases but difficult to recognise as being non-normative. Most burnt bone, however, was found in the primary context of the hearth. The majority of finds are found in internal contexts and on the horizontal interface (floor surface) and in so-called 'use' deposits of occupation soil and hearth deposits (figs 6.49-6.50). Most are associated with subsistence activities, followed by those representing craftworking activities (figs 6.51-6.52). Those structures with evidence for hearths and/or subsistence finds comes to 77% which implies that less than one in four structures performed a role as a non-domestic ancillary structure. Fig 6.56 reveals the relationship between activities and height above sea level. Domestic, storage, craftworking, and byres are found at all areas of the landscape. Domestic activities are slightly more common on the lower slopes, storage at slightly higher levels. Metalworking and craftworking are least popular on the upper slopes. Textile production and craftworking are most popular on high settlements.

Brück (1999b) suggested that where *both* domestic and ancillary tasks were represented this was evidence for the changing role of the structure over time. For the current dataset it was found that the majority of structures have only one function type and that the number of multi-function structures is actually quite low (fig. 6.53). The fact that only the minority of structures reveal a trend towards multi-functionality is seen as evidence for the abandonment of structures after just one generation (see 7.4 & 8.4). The vast majority of structures are primarily domestic in nature. Next popular is the combination of domestic tasks and grain storage/preparation (figs 6.54-6.55). Grain storage/preparation is only rarely found in separate *circular* structures. Metalworking is the activity least likely to be associated with domestic activities. As the number of functions represented increases this is more likely to reveal an ageing structure which has made the shift from a domestic to an ancillary function. It is interesting then that the activities of metalworking, craftworking, textile production, and to a lesser extent byres and storage are increasingly likely to take place in multi-function structures. Brück (1999b) suggested that circular ancillary structures may only have been the preserve of well-established households

²² The idea of an 'aceramic' north can now be rejected: almost one in two prehistoric circular structures contain ceramics in northern and central Britain (see also Willis 1999). Domestic assemblages are however smaller than those in southern England which might reveal that other vessel types were more popular with northern communities. Regionally, ceramics are most popular in the Yorkshire Pennines region and least in the Midland Plain.

with greater resources. It is further suggested that craft production rather than food production was most likely to take place in an ancillary structure (contra Ellison 1987).

6.4.2 Food Production

Most structures provide evidence for the production of food. Evidence for boiling food over the fire exists in the form of sooted ceramic vessels. The number of pot-boilers found in internal contexts also implies the use of cooking-pits or non-ceramic vessels for heating such as wood or leather. The roasting of meat over the fire on a spit, or in pits and ovens is also represented. There is also evidence for the grinding of grain into flour, presumably for flat bread for cooking on a slab, over the fire or in some cases baking via retained heat in a pit or clay oven. Dairying might also be assumed from the evidence for byre structures. For some communities, hunting was revealed in finds of arrowheads and the bones of deer and occasionally boar. Fish bones were found at LBA-EIA Cnoc Stanger and RIA Din Lligwy. At some sites, shells, hazelnuts and even berries at LrIA South Shields reveal gathering activities. Shells were found at eleven, predominantly coastal sites: no real regional bias was found but so far they occur no earlier than the 1st millennium BC. Storage of grain took place within the main domestic structure and in separate ancillary structures whether these were ageing circular structures formerly used in a domestic capacity or separate circular or recti-linear structures. The latter were provided at 46 sites (only 18 of which were the same sites as those with pits). A further forty sites revealed evidence for an annexe which may also have been used for this purpose. Storage of seed probably took place in external pits which were provided at 43 (one in seven) sites.

6.4.3 Craft Production

Craft production took place both within the main domestic structure and in separate ancillary structures. Eighty-six sites provided evidence for post-built recti-linear structures and structure annexes either of which may have been used as ancillary craftworking structures. The latter may also have been provided in ageing circular structures no longer being used for domestic activities. Main craft activities involved flint knapping; textile production - in particular spinning but with some evidence for weaving²³ - and metalworking: with only slightly more evidence for ironworking than for non-ferrous metalworking. It is still assumed that smithing in a domestic context is rare (Sharples forthcoming) however this research reveals metalworking, particularly smithing activities, to have a fairly common domestic context with at least one in six sites having evidence for metalworking activities. It is desirable to undertake ironworking indoors for shelter and to control flame colour which is easier to observe in low light levels (Crew 1989a). It is suggested that we are still too engaged in the romantic notion of the

²³ Weaving may be under-represented in north and central Britain due to the poor survival of bone combs.

metalworker as an itinerant, male magician to deal with the domestic evidence for metalworking sensibly. A number of smelting activities have been shown to occupy non-domestic stake-walled, single-ring structures as working areas and experiments have so far revealed these to be unroofable (see 4.4.3). Minor crafts include the working of bone and antler, cannel coal and glass.

6.4.4 Byres

Invaluable for their milk, meat, dung, wool and leather, it is suggested that both sheep/goat and or cattle were stalled, either alongside human inhabitants in some larger circular structures, or separately in ancillary structures and ageing formerly domestic structures. In the ethnographic literature surveyed, 50% of communities provided space for their livestock within the dwelling and those who do not often have an external protective stockade. Larger double- and triple-ring houses were twice as likely to provide space for livestock than were smaller simple-ring structures: providing a clear correlation between house size and their use as byre-dwellings. The animals housed are most commonly cattle or calves and goats. In most cases their housing is for the overnight period only and animals are partitioned off from the human inhabitants or are tethered. The Kipsigis, however, allow their sheep to settle at will whilst they sleep in the attic with only some goats tethered around the wall (Peristiany 1939, 158; Orchardson & Matson 1961, 85). It is then not only possible to share living space with livestock in a circular dwelling but the practice is actually fairly common in modern African pastoralist societies as well as being known for late prehistoric continental Europe and Anglo-Saxon Britain. Stalling animals within the house would be invaluable in terms of increasing house temperature (Gebremedhin 1971, 120). Both sheep and cattle were successfully housed in Reynolds first *Moel y Gaer House* (Reynolds 1988, 18).

Pryor's (1984) analysis of soil phosphates at Cat's Water, Fengate revealed different levels in different structures, which he concluded meant that both animals and humans had occupied roundhouses but that they did so separately (Pryor 1984, 218). A more intensive study of soil phosphorus levels within the individual roundhouses at EIA Erw-wen and LrIA Moel y Gerddi in Gwynedd, revealed higher levels at the periphery and low values - suggestive of deliberate cleaning - towards the centre (Kelly 1988a, 115-17). A similar pattern was found at EBA Lintshie Gutter, RIA Cefn Graeanog and perhaps also at LrIA Dalnaglar (Banks 1995b; Conway 1983; Stewart 1961-62). This might support the concept of animal stalling in some roundhouse peripheries, with human occupation concentrated on the central area and attic. There are few good bone assemblages from northern and central Britain because of the acidic nature of many of the soils. In southern England sheep generally represent c. 50% of site assemblages (Dale Scjcantson pers. comm.). At Dragonby (Lincolnshire) sheep represent 66% of the assemblage;

71% at Dalton Parlours (Wrathmell & Nicholson 1990). However cattle was the dominant species at the sites of Coxhoe, Doubstead, Coton Park, Thorpe Thewles, Hartburn, Kennel Hall Knowe and Dryburn Bridge, Catcote, Port Seton and Broxmouth (see also Hambleton 1999).

6.5 Discussion

Evidence from flooring and partitions reveal that division of space within the roundhouse is based around two factors: centre-periphery and front rear both of which are concerned with the provision of light. The hearth is generally in a central position but also front of centre. Pits tend to be positioned at the front, particularly front left, and the rear right of the structure. Most finds tend to be at the front of the structure near the entrance and again at the rear of the structure. Beds are often found at the rear periphery of the structure but might also be found in an attic. Storage activities take place in the periphery or the attic/loft. Livestock are stalled in the periphery of larger structures. Use is also made of external space. Fig. 6.57 provides some alternative representations of prehistoric domestic space based on the main trends in the data. The roundhouse is predominantly domestic in nature and combines activities such as storage and food preparation. Ancillary structures are rare and most likely to take the form of aging domestic structures. Such structures are the focus for craftworking activities.

The majority of structures are provided with a hearth during the LrNeo-EBA. The provision of a hearth becomes particularly important during the MBA and LBA periods, increasing to c. 85% of structures (fig. 6.58). A major shift occurs at c. 800 BC when a majority of structures (60%) are *not* provided with a hearth, this trend wanes steadily until c. 400 BC when the situation returns to a majority of structures (70%) being provided *with* a hearth. This declines again, and from the LrIA period onwards around 50% of structures have a hearth. The provision of external hearths drops dramatically from c. 55% in the LrNeo to just 10% by the LBA (fig. 6.59). From c. 800 BC throughout the EIA external hearths are only provided in addition to internal hearths. At c. 400 BC there is a dramatic increase in external hearths which now make up c. 55% of the whole. This declines equally rapidly during the LrIA reaching relative stability. Perhaps unsurprisingly, most hearths are provided in the northernmost region of Highland Scotland, least in the southernmost region of the Midland Plain (fig. 6.60) and particularly the Midland Plain but also Yorkshire have a much higher proportion of external hearths than elsewhere (fig. 6.61). It is suggested that those structures without hearths were either ancillary or seasonal structures.

Hearthstones are most popular in the LrNeo-EBA period (fig. 6.62). Pit-hearths are most popular in early contexts but remain an influential type throughout prehistory. Cooking-pits are most popular in the EBA and become increasingly unpopular during the LrIA. Slabs and kerbed

setting become increasingly popular throughout time and are the dominant type from the LrIA onwards. The use of ovens makes a big impact with its LBA origins but remains only a minor type throughout prehistory. The main regional trend is that ovens are most popular in the southern regions and that there is a relative unpopularity of the cooking-pit in north Wales and the North Sea regions (fig. 6.63). Also noticeable is the similarity of types in the three northernmost regions compared to greater variability of types elsewhere. There is reasonable variation in hearth position at and before c. 2000 BC with some preference for the right side of the house in the EBA (fig. 6.64). Hearth position becomes standardised in the MBA towards a central position, this eases off in the following periods but remains the dominant position. A central position becomes increasingly likely again at c. 400 BC easing off again to become increasingly variable by c. AD 50 and increasing again in the RIA period. Regionally, a central position is most dominant in Highland Scotland and the Yorkshire Pennines, least so in the North and Irish Sea regions (fig. 6.65).

Regarding the provision of pits, the number increases dramatically at c. 2000 BC, falling back equally dramatically at c. 1000 BC, then increases steadily to a new peak at c. 400 BC after which it again declines (fig. 6.66). Regionally, there is little variation in the provision of pits which are, however, most popular in the Yorkshire Pennines (fig. 6.67). Noticeable again is the similarity between the three northernmost regions. The provision of partitions begins at c. 2000 BC reaching an all time high during the EBA, followed by rapid decline in the MBA (fig. 6.68). A slight increase up to c. 800 BC is followed by decline again in the EIA to a continuing stability. Annular and radial divisions are most popular from the MBA until c. 800 BC (fig. 6.69). Entrance partitions are most popular in the EIA with radial and annular forms again most popular between c. 400 BC – c. AD 50. A trend for chordal division begins in the LrIA increasing to a majority type in the RIA. Regionally, partitions are slightly more popular in the north and west (fig. 6.70). Annular and radial divisions are least popular in the Midland Plain and entrance divisions are absent in the Yorkshire Pennines (fig. 6.71). Chordal divisions are least popular in Highland Scotland and the Irish Sea regions.

Made floors are most popular in the early periods but soil or perhaps wooden floors begin to be used in the EBA and remain one of the dominant types until c. 400 BC (fig. 6.72). The use of dual flooring is by *far* the dominant type at c. 800 BC and remains one of the main types into the RIA. Paving increases steadily from the EIA to become the main type in the RIA. Fig. 6.73 reveals the real regional variability in floor type. Most noticeable is the absence of dual flooring in the Midland Plain and the popularity of paving in the Yorkshire Pennines and Irish and North Sea regions. In terms of patterning in flooring, there is a clear centre-periphery dominance throughout the Bronze Age and ErIA which wanes only during the LrIA period (fig. 6.75). Similarly, regarding spatial emphasis, annular division is dominant throughout the Bronze Age

right up to *c.* 400 BC at which point discrete areas take over (fig. 6.74). Both are found in the LrIA onwards with a rise in chordal division peaking in the RIA. Interesting regional patterns reveal the high level of left-right patterning in the Yorkshire Pennines and focus about the hearth in the Irish Sea region (fig. 6.77). Again, the three northernmost regions share many similarities. Spatial emphasis reveals the dominance of annular division of floor space in the Yorkshire Pennines (fig. 6.76). Figs. 6.78-6.79 show trends in the occurrence of occupation soil which may reveal the periods of *c.* 2000 BC, *c.* 800 BC, and *c.* 400 BC to be those of changes in patterns of sedentism.

Fig 6.80 reveals there to be an increase in the provision of central space in the EBA and an increase in peripheral space at *c.* 800 BC, *c.* 400 BC and again at *c.* AD 50 with corresponding dips in between these points. There is also a decline in peripheral space in the MBA and in central space in the LBA. A general increase in size is indicated at *c.* 800 BC. Structures in Highland Scotland tend to have more peripheral space, whilst those in the Midland Plain tend to have more central space (fig. 6.81). In the Yorkshire Pennines a generally large size is indicated. Fields or plots in immediate proximity to the house are predominantly a Bronze Age feature, as are domestic middens (fig. 6.82). Pits are at their most popular in the 1st millennium BC, reaching a peak at *c.* 400 BC when there is also a slight increase in the number of ancillary structures. The use of boundaries tends to increase in the 1st millennium BC and the use of yards begins in the LrIA reaching a RIA peak. After an early dominance – presumably because of the inclusion of flints in the category – craft production remains fairly constant from the LBA onwards, bar an absence of evidence in the EIA. Regionally, fields associated with the settlement are absent in the Irish Sea region where yards are dominant (fig. 6.83). Yards are almost absent in both the Yorkshire Pennines and Midland Plain, whilst pits are more popular in these regions. In addition, ancillary structures are slightly more popular in these regions. Craft production is slightly more popular in north Wales and the North Sea regions. Middens are more frequent in the west.

There is a general trend throughout prehistory towards the lone function of structures (fig. 6.84). Multi-function structures are most popular in the LBA and if we accept that multi-functionality is indicative of ageing structures (cf. Brück 199b), this may reveal a greater degree of sedentism at this time. Major shifts are present at *c.* 2000 BC, *c.* 800 BC and at the start of the RIA. There is little variation regionally, however, lone function structures are least popular in north Wales and most popular in the Midland Plain where multi-function structures are also absent (fig. 6.85). In terms of the type of activities taking place, the greatest shift seems to occur at 2000 BC (fig. 6.86). Textile production and metalworking both begin in the MBA, each peaking in the later 1st millennium BC. Other craftworking activities – with their peak in the MBA – remain popular until *c.* 800 BC. Arable activities reach a peak at *c.* 800 BC when textile production is

absent. The proportion of structures with a domestic or byre function tends to remain fairly stable throughout, although the former is vastly dominant at *c.* 2000 BC and the latter is slightly more popular in the early 2nd millennium BC. Regionally, the Yorkshire Pennines and Midland Plain regions have the highest proportion of domestic circular structures at the expense of those with an agricultural function (fig. 6.87). Craft production activities are fairly stable throughout, although there is less evidence for textile production in Yorkshire than elsewhere and slightly more craftworking activities in Highland Scotland which may represent the greater use of flint in this region.

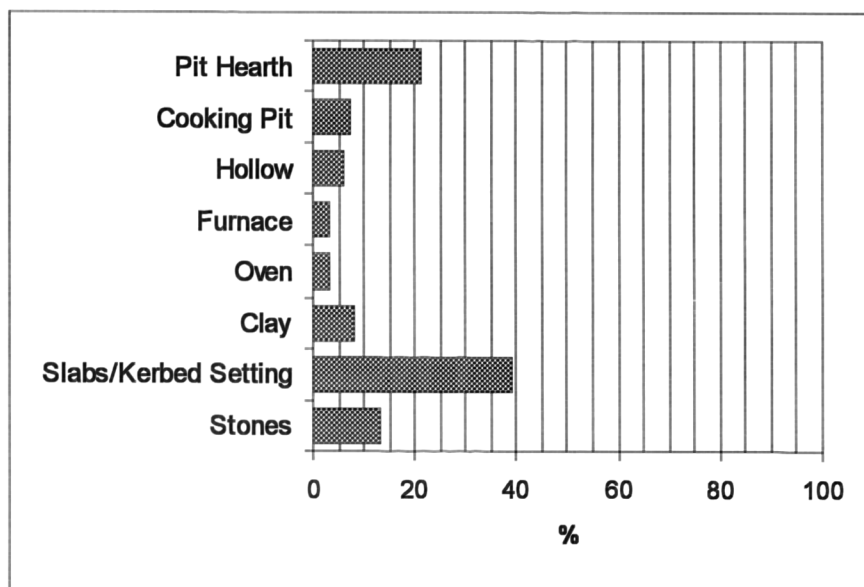


Fig 6.1 Hearth Type in north and central Britain

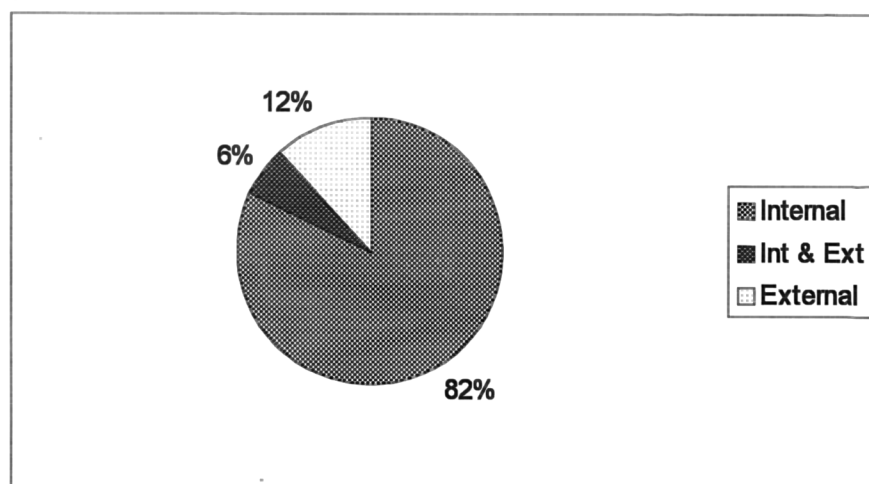


Fig 6.2 Internal and external hearths

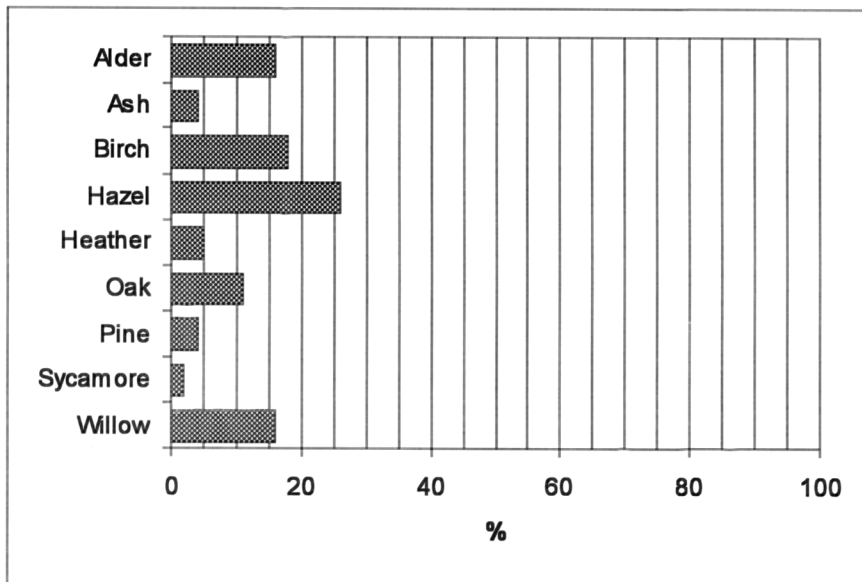


Fig 6.3 Fuel identifications

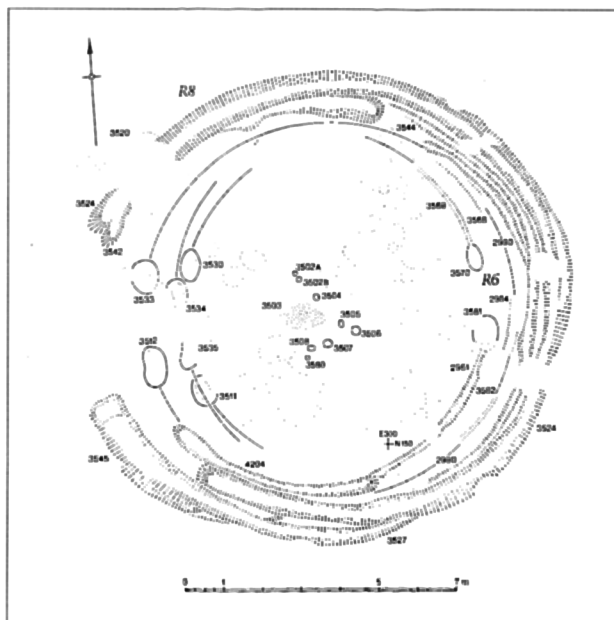


Fig 6.4 Hearth furniture at Collfryn CS 8
(after Britnell *et al.* 1989)

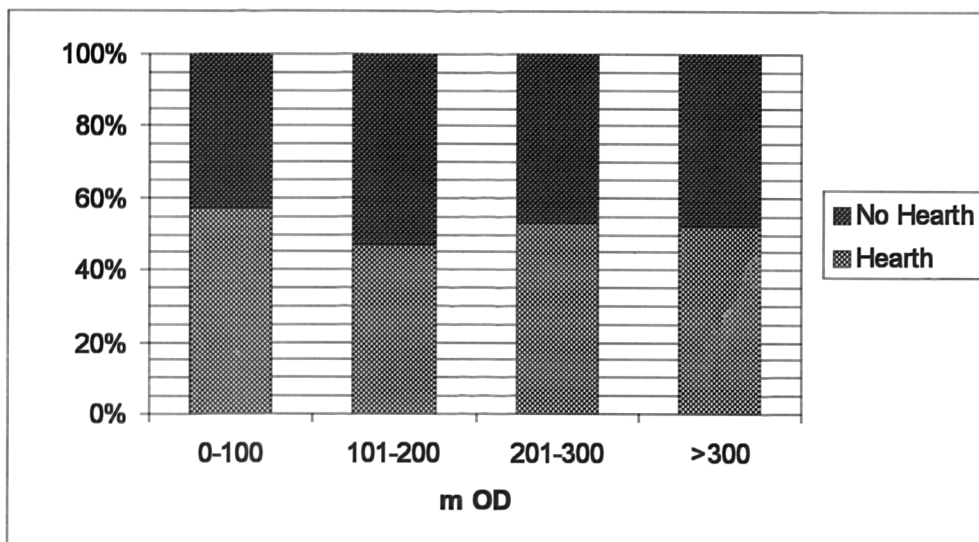


Fig 6.5 Height above sea level and the provision of a hearth

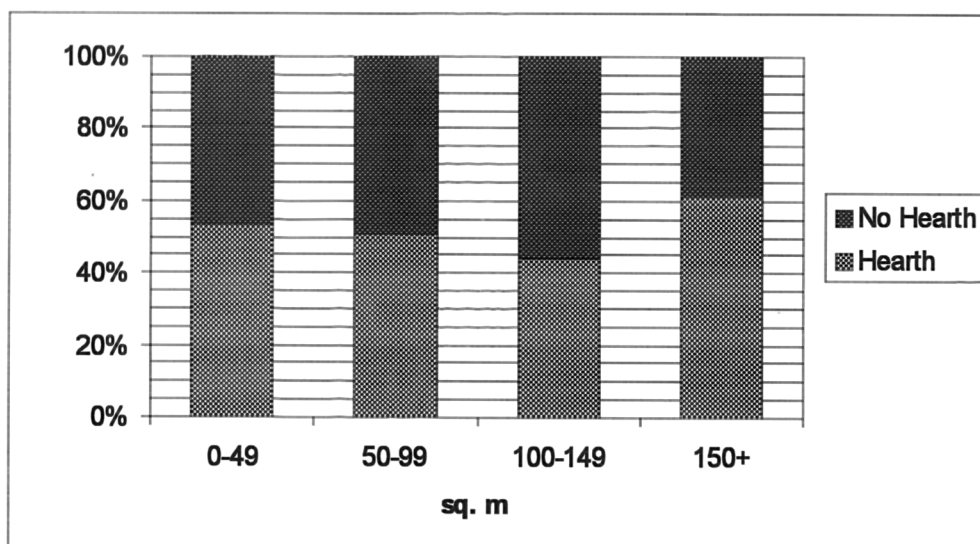


Fig 6.6 House size and the provision of a hearth

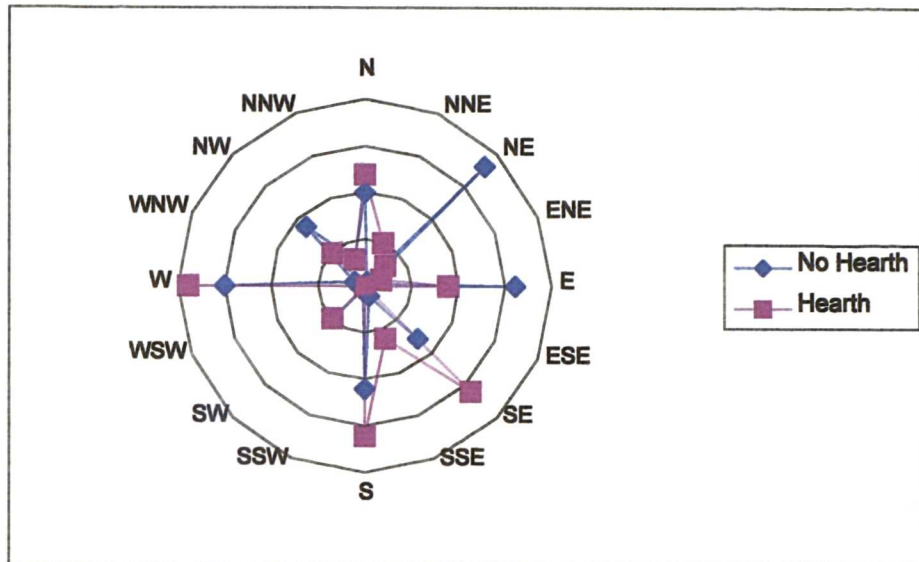


Fig 6.7 Slope direction and the provision of a hearth

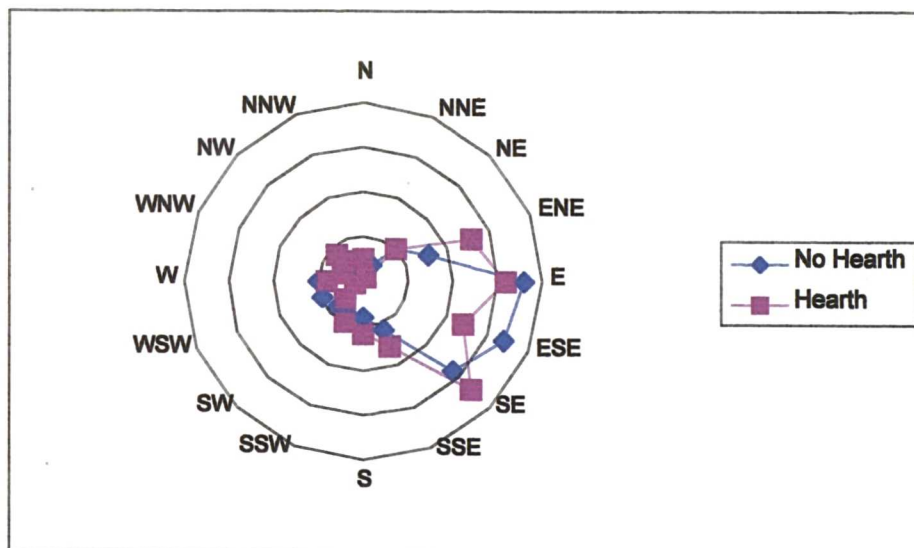


Fig 6.8 Structure orientation and the provision of a hearth

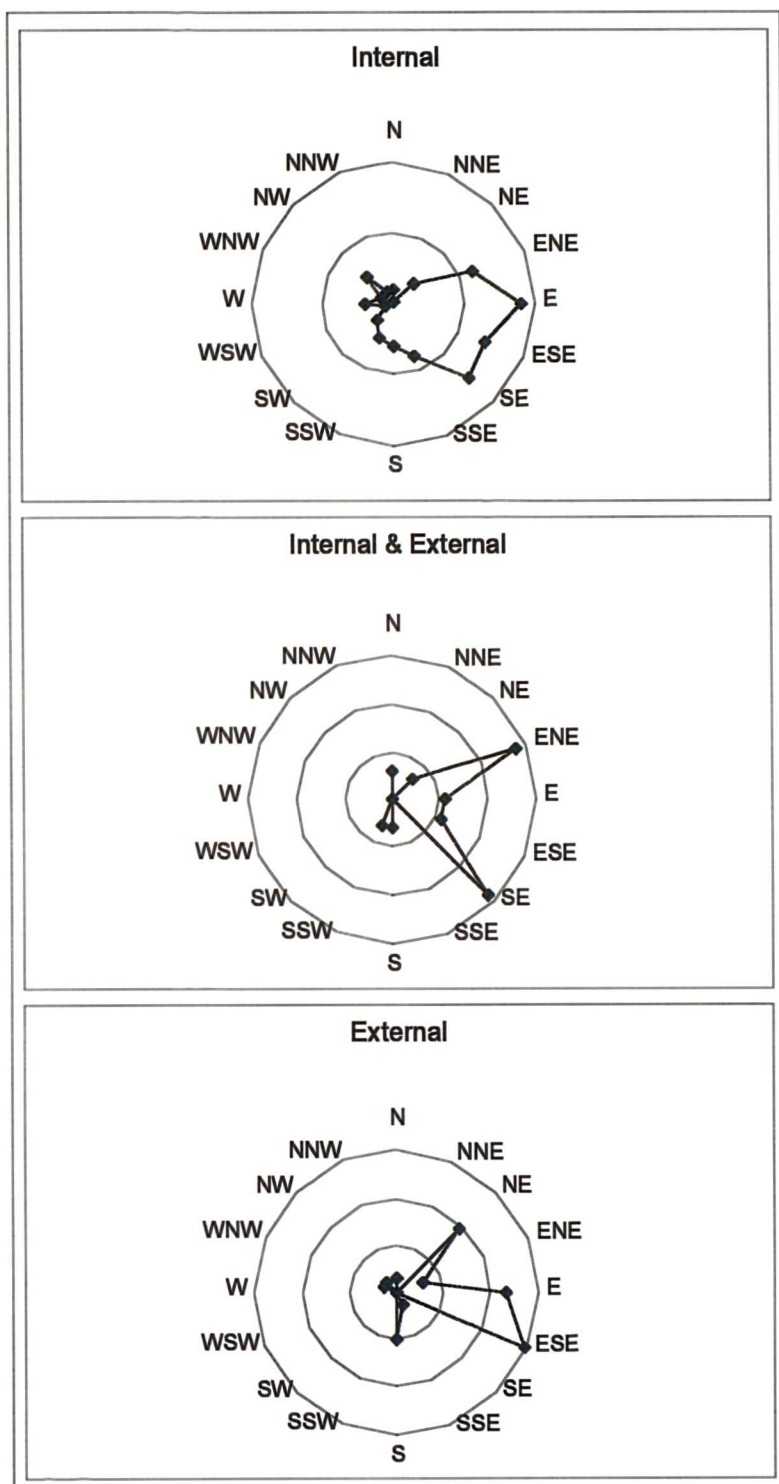


Fig 6.9 Hearth Position and structure orientation

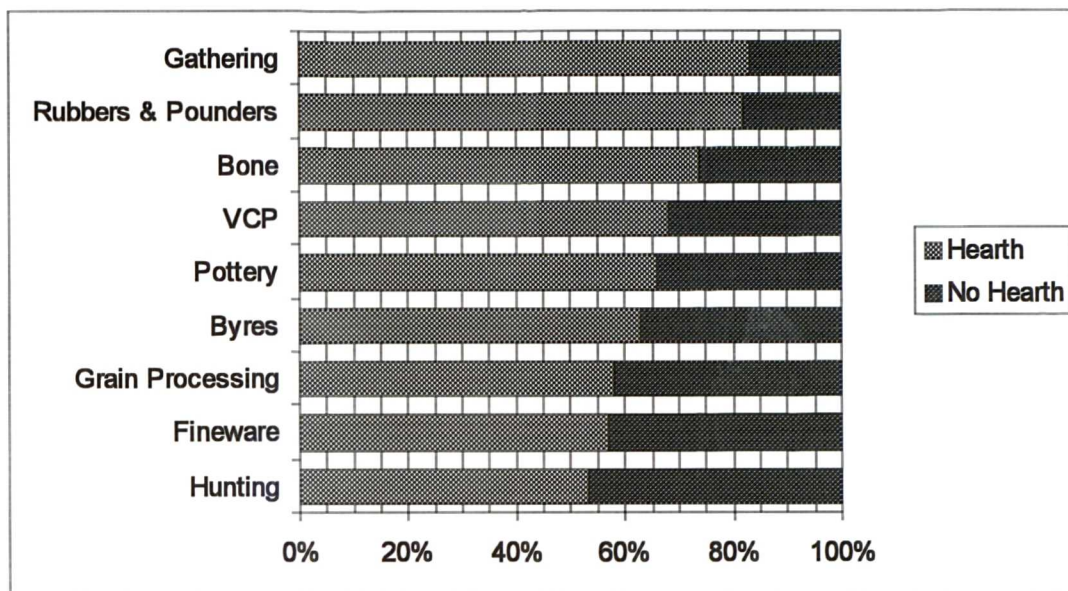


Fig 6.10 Evidence for food production and the provision of a hearth

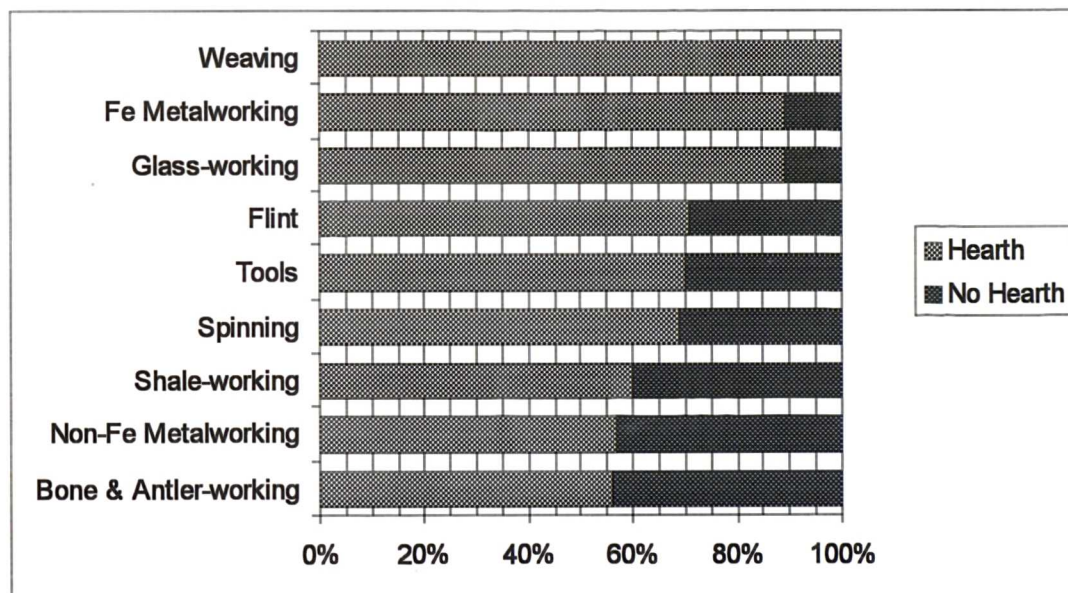


Fig 6.11 Evidence for craft production and the provision of a hearth

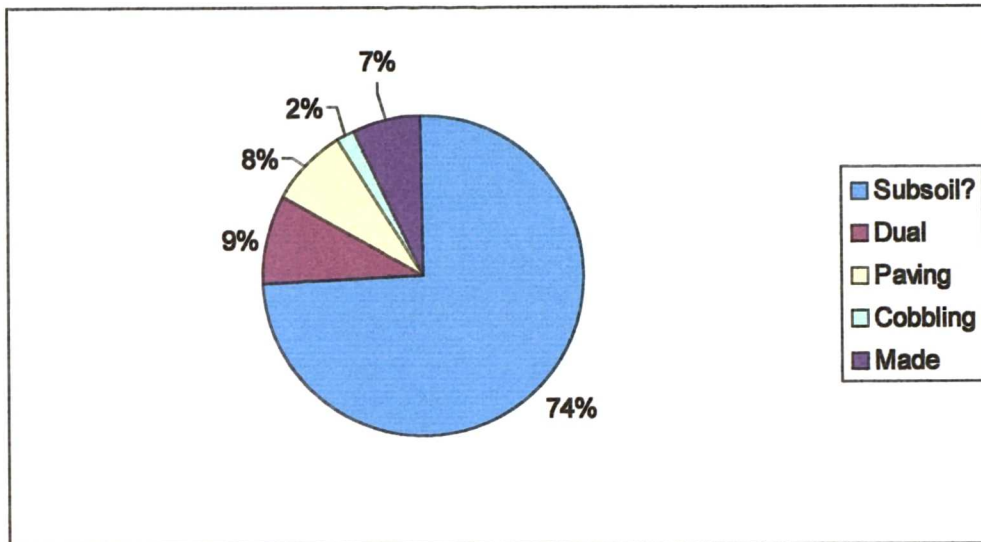


Fig 6.12 Floor type in north and central Britain

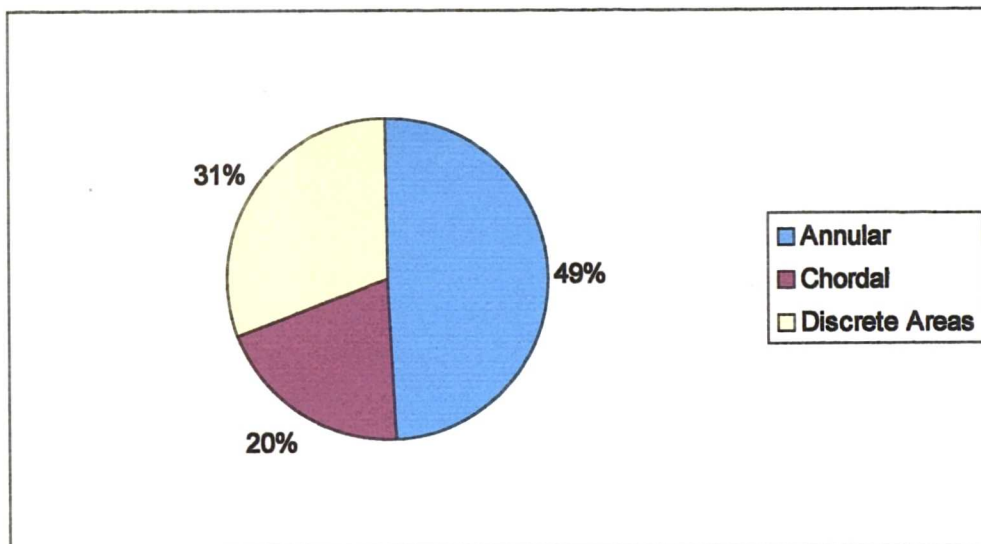


Fig 6.13 Spatial emphasis present in dual flooring

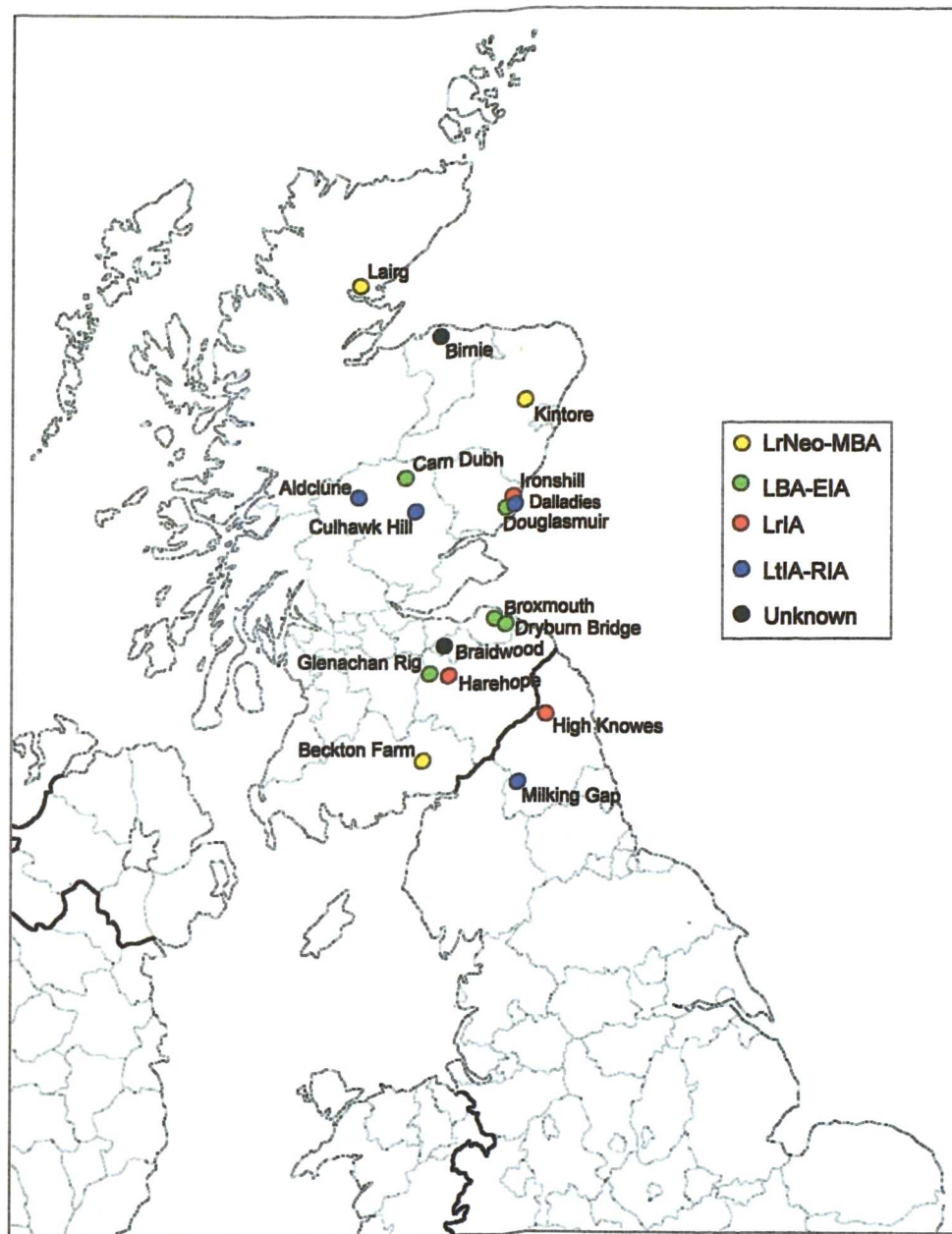


Fig 6.14 Distribution of excavated ring-ditch structures in northern Britain

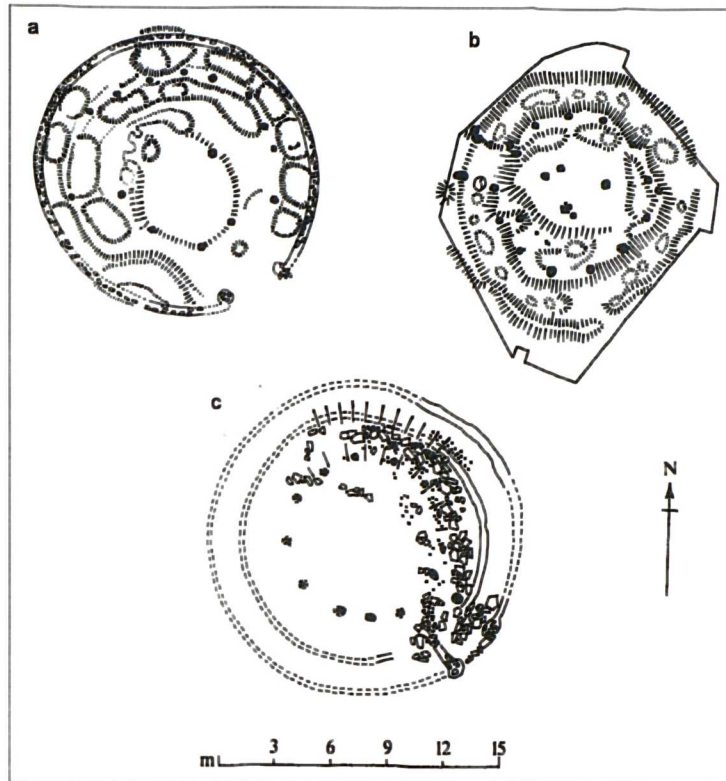


Fig 6.15 Ring-ditch structures: a) High Knowes A CS 1; b) Braidwood CS 1; c) Broxmouth CS 2 (after Reynolds 1982)

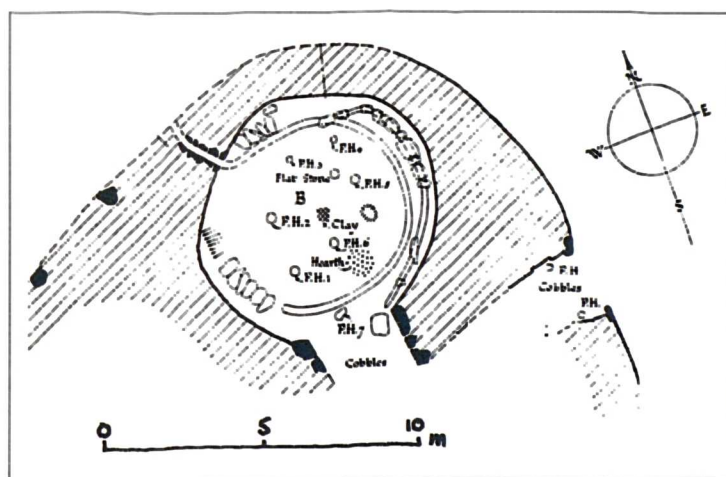


Fig 6.16 Internal drains at Caerau I (after O'Neil 1936)

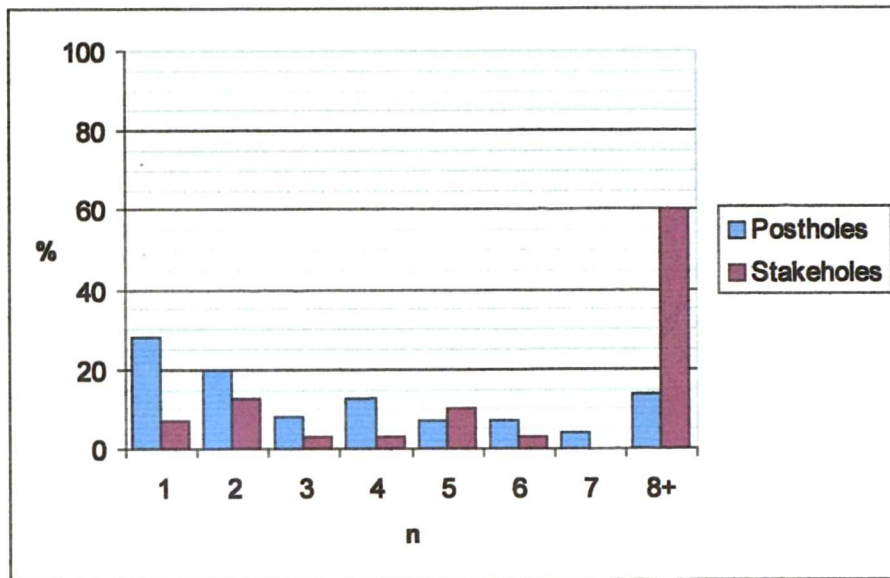


Fig 6.17 Number of internal postholes and stakeholes

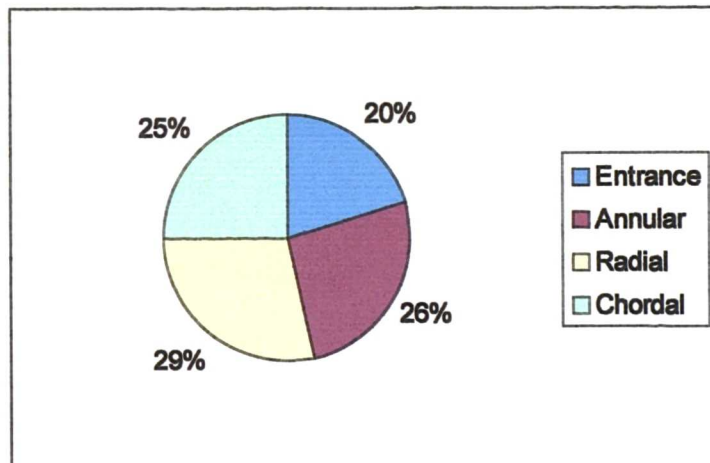


Fig 6.18 Partition type

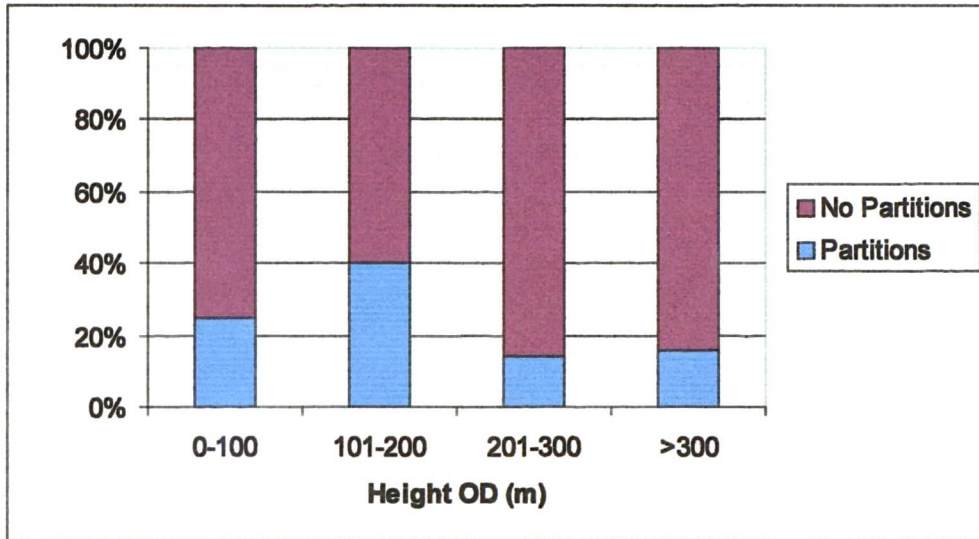


Fig 6.19 The provision of partitions and height above sea level

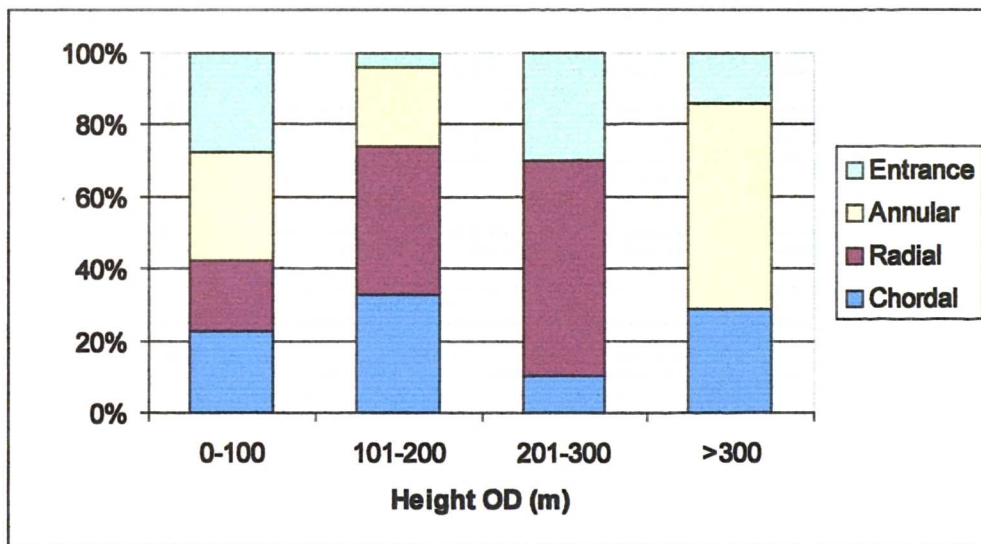


Fig 6.20 Partition type and height above sea level

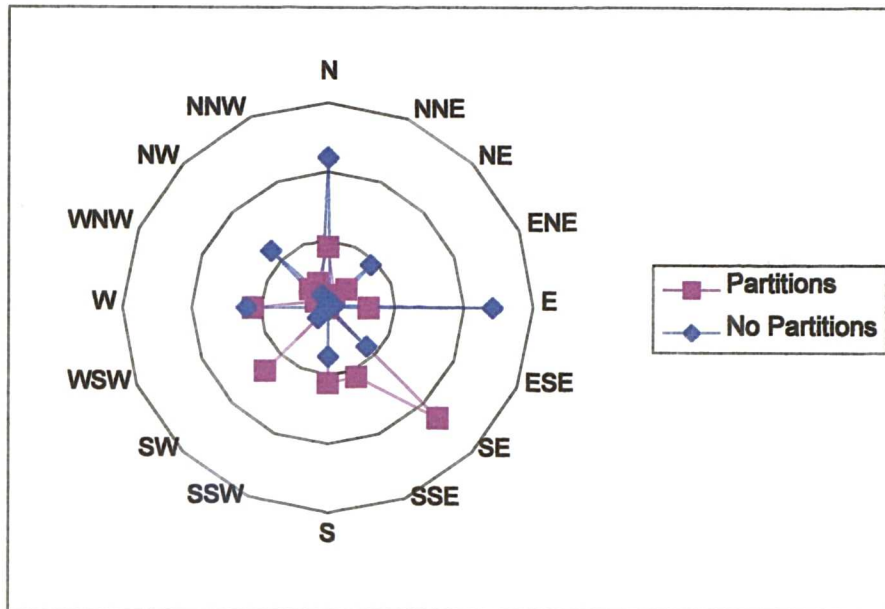


Fig 6.21 Slope direction and the provision of partitions

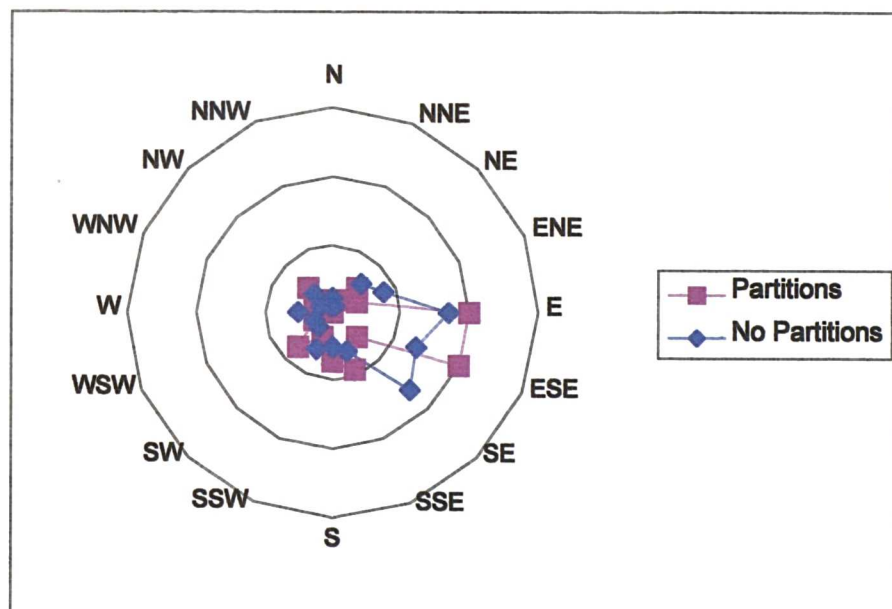


Fig 6.22 Structure orientation and the provision of partitions

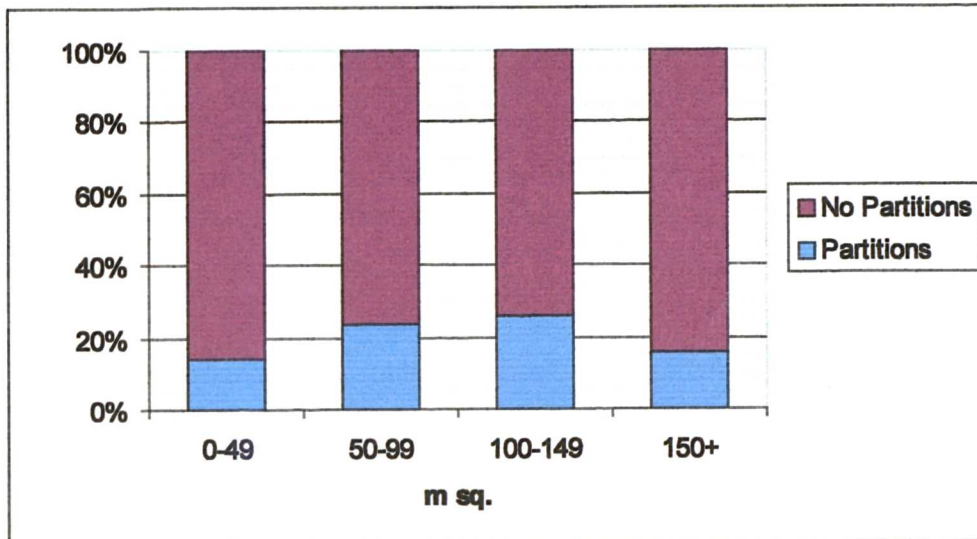


Fig 6.23 Structure size and the provision of partitions

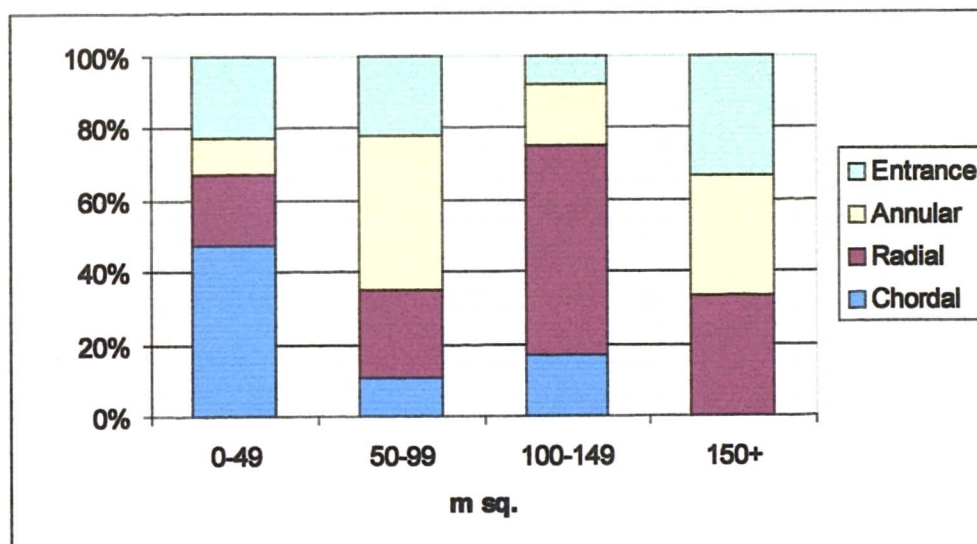


Fig 6.24 Structure size and type of partition

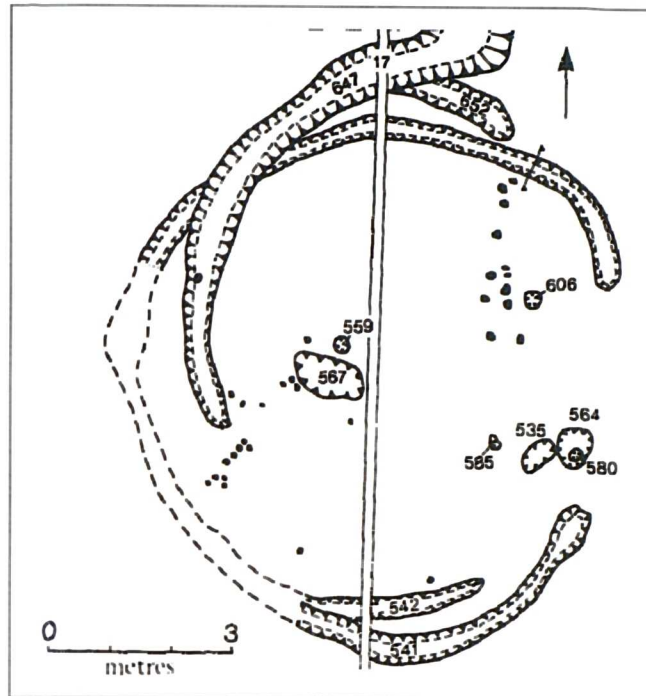


Fig 6.25 Radial divisions at Thorpe Thewles CS C

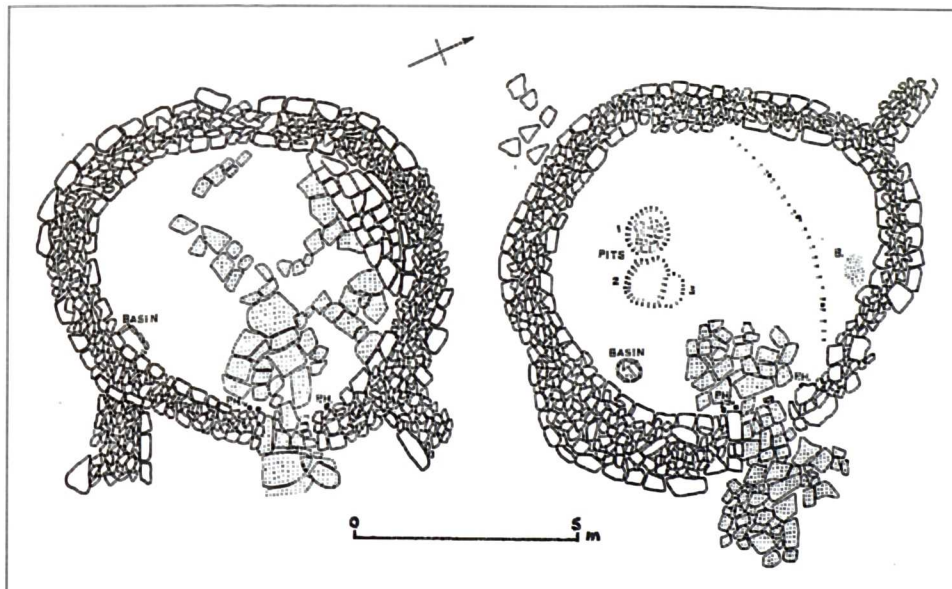


Fig 6.26 Sleeping areas at Bridge House CS 1 & CS 2 (after Jobey 1960)

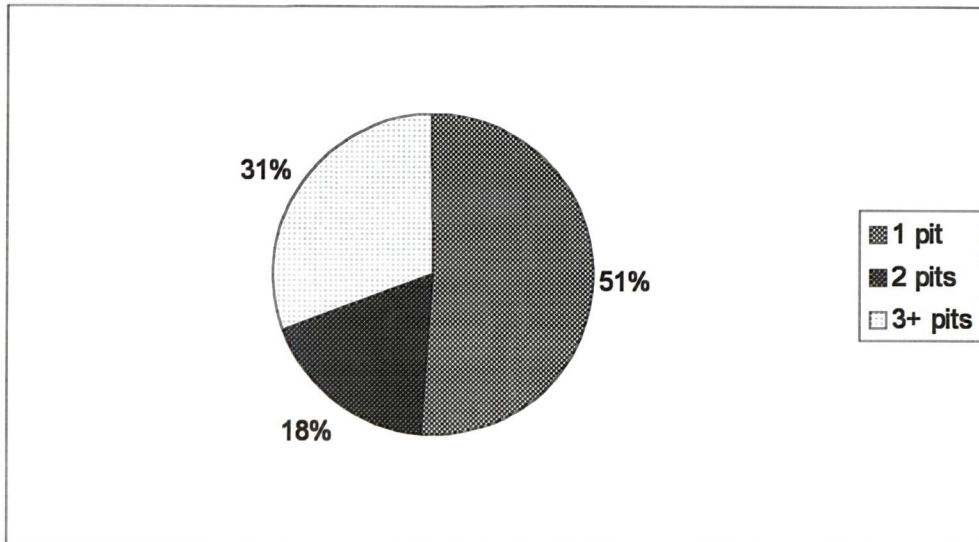


Fig 6.27 The provision of pits in circular structures

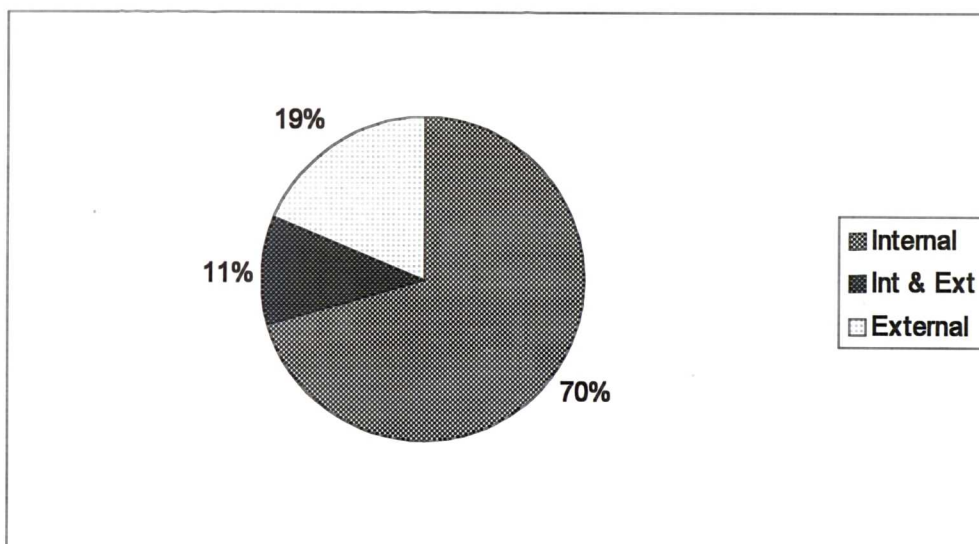


Fig 6.28 Internal and external pits

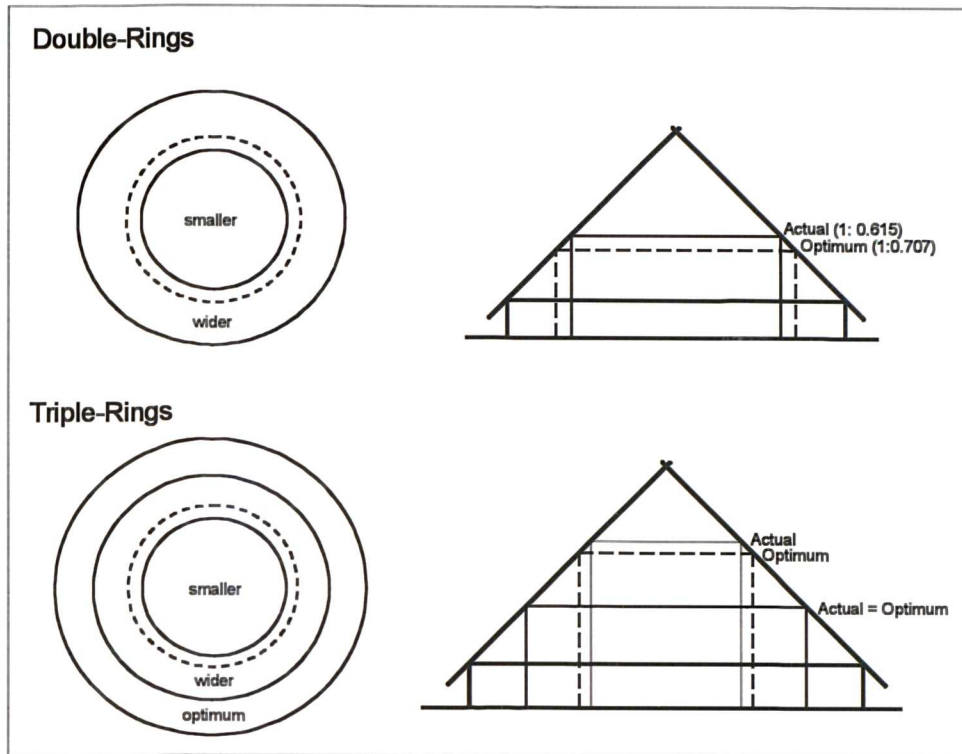


Fig 6.29 How use of space influences structure design

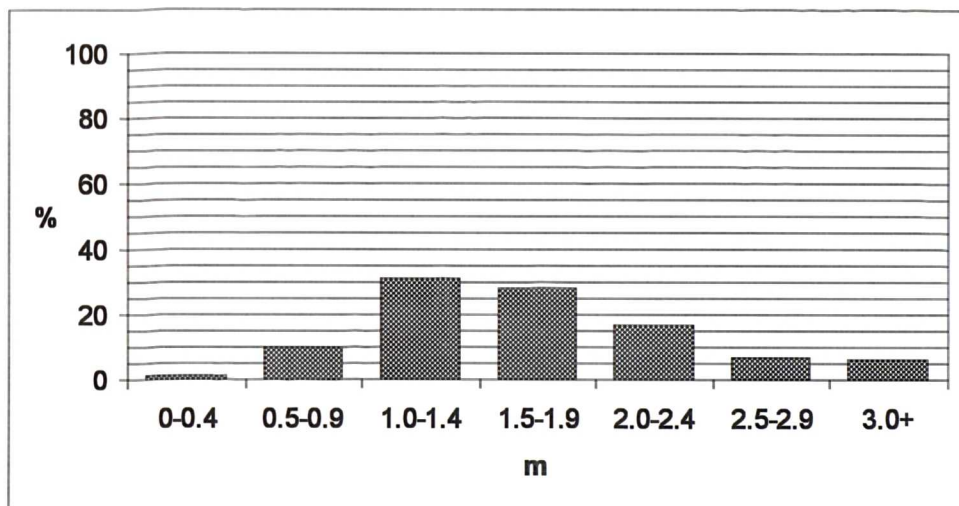


Fig 6.30 Periphery width in double-ring structures

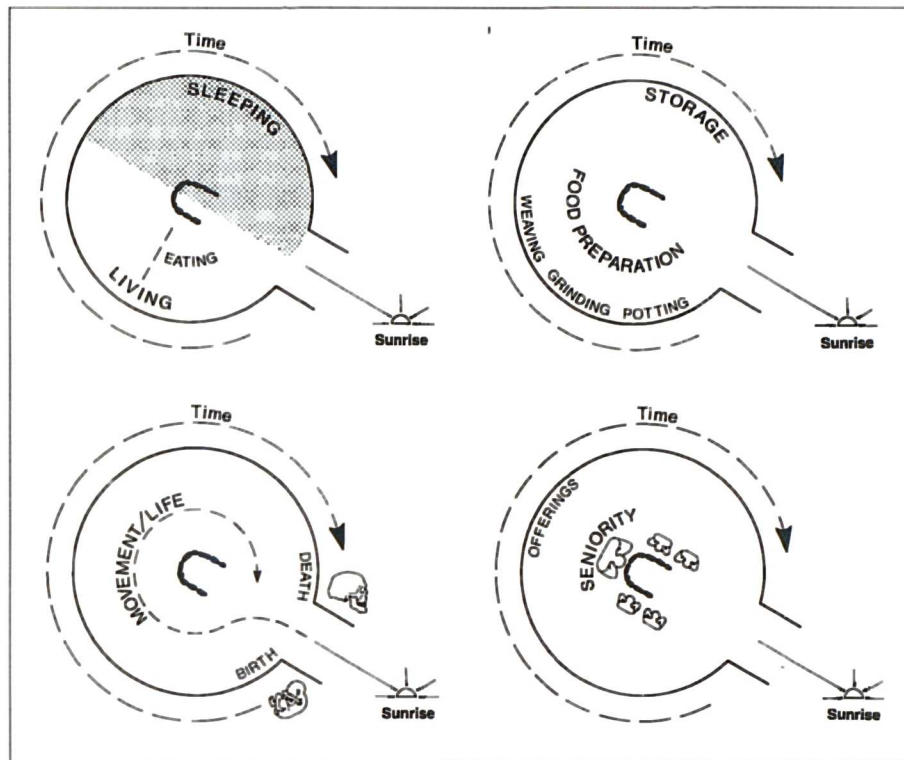


Fig 6.31 The cosmological model (after Parker Pearson 1999)

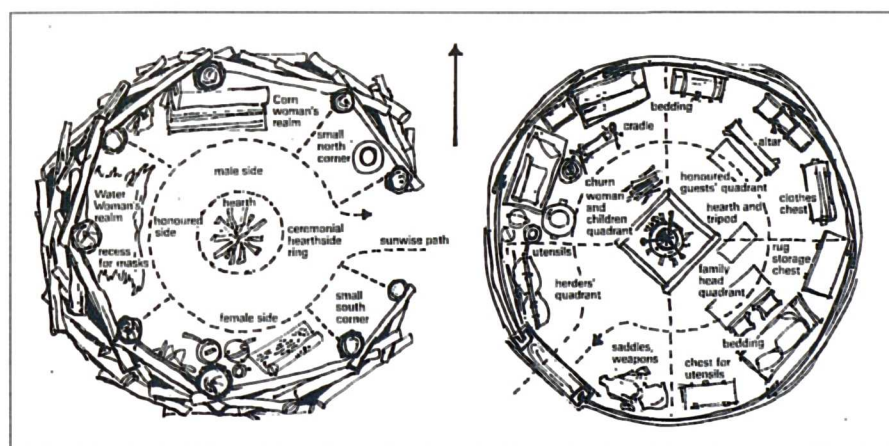


Fig 6.32 Use of space in the hogan and ger (after Oliver 1987)

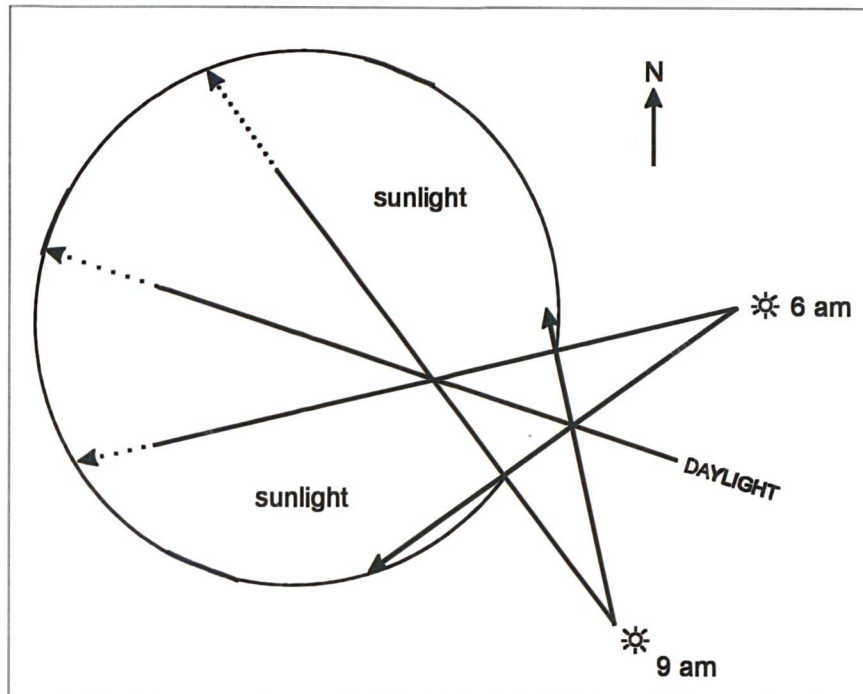


Fig 6.33 How light falls in the average prehistoric circular structure

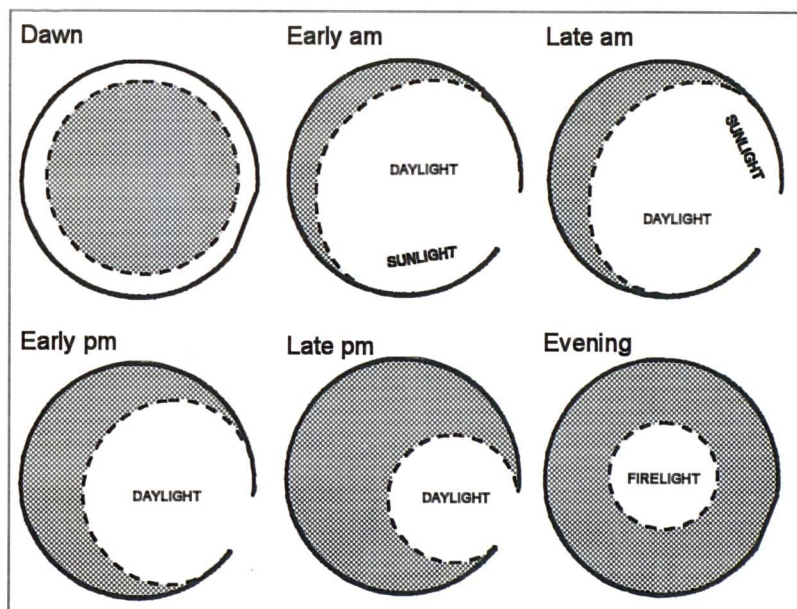


Fig 6.34 The distribution of light throughout the day

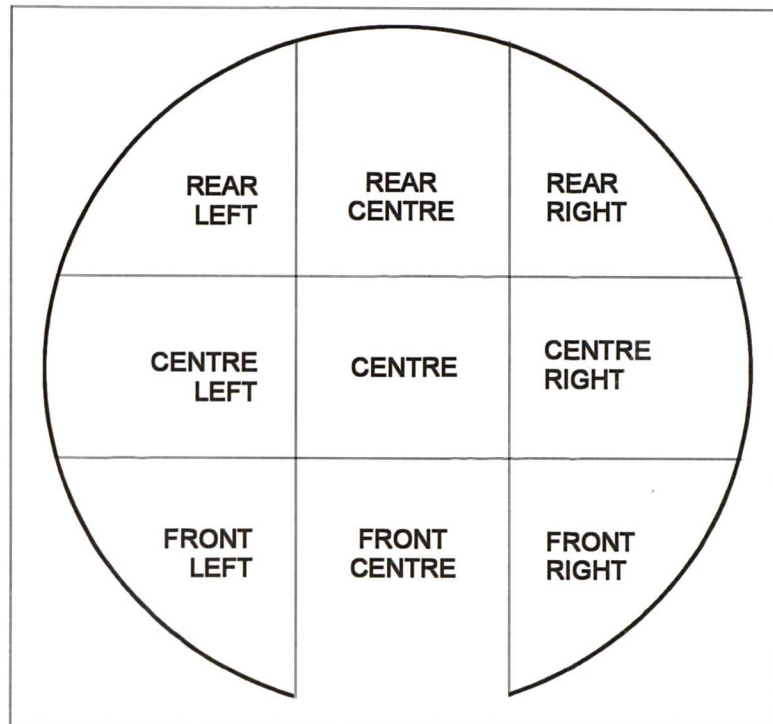


Fig 6.35 Scheme used in spatial analyses

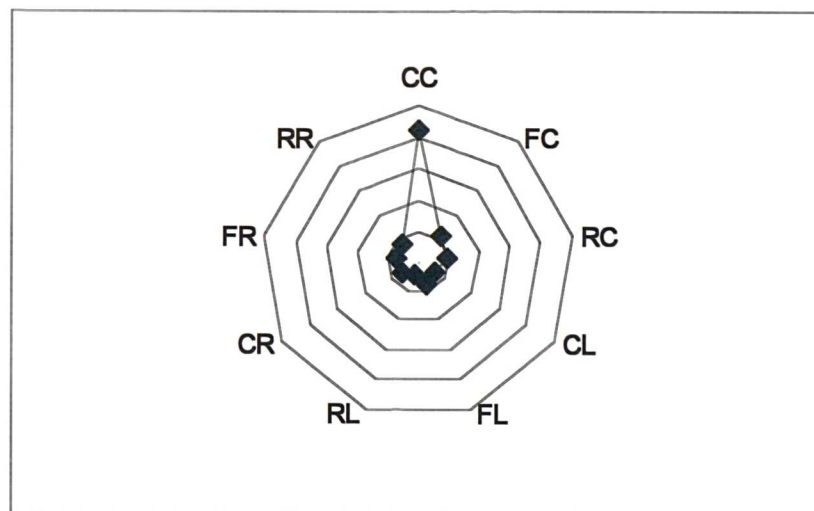


Fig 6.36 Hearth position

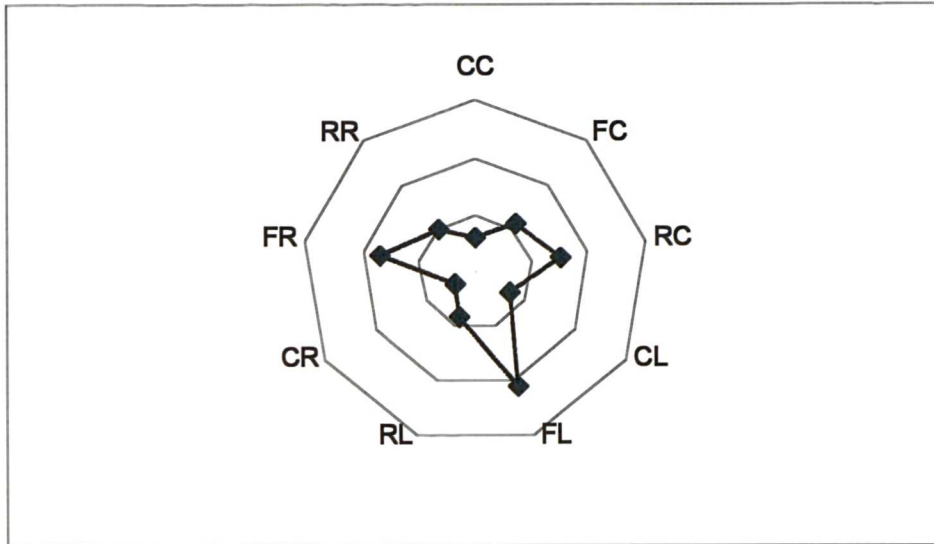


Fig 6.37 Position of pits within circular structures

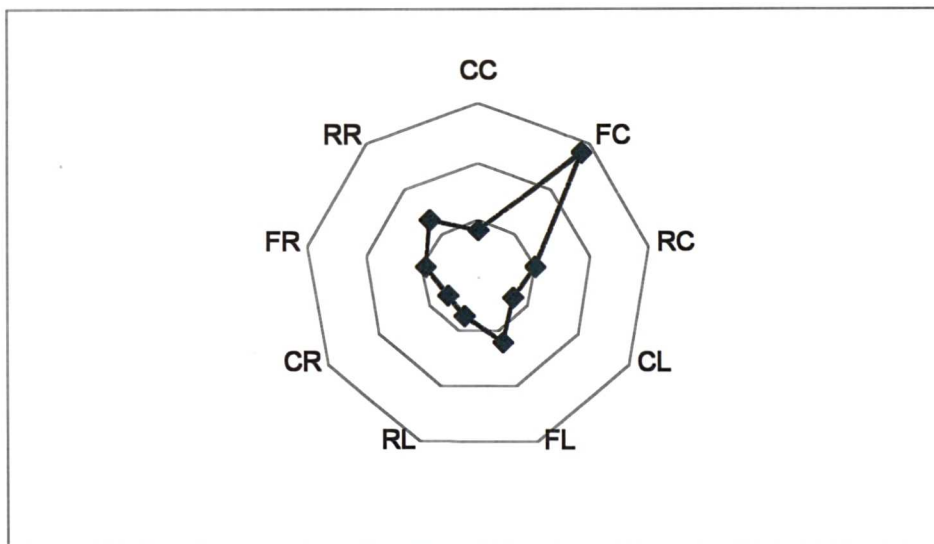


Fig 6.38 Position of finds within circular structures

*Now
calculated
- highest
%?*

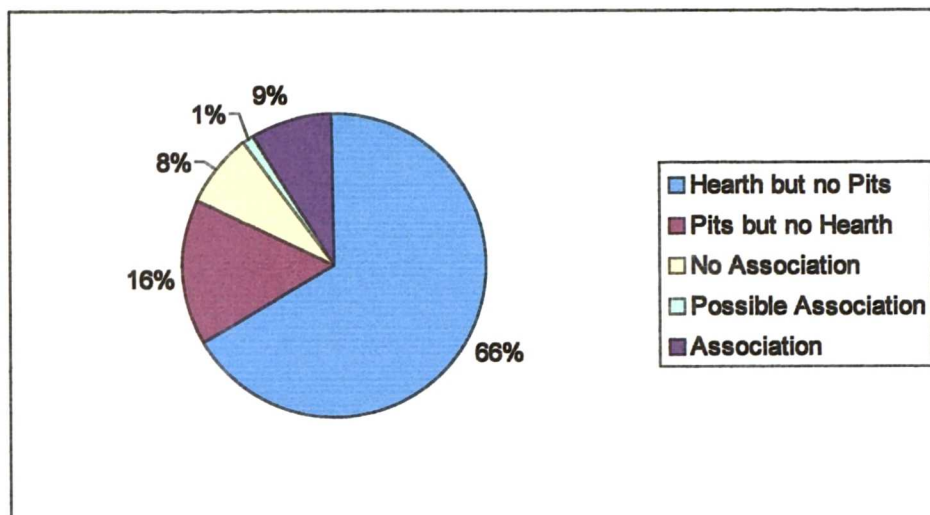


Fig 6.39 Association between hearths and pits

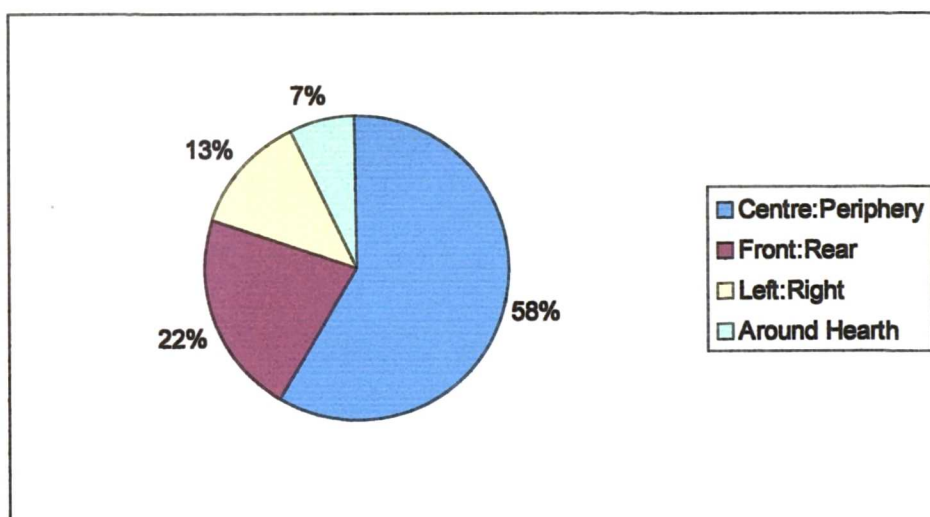


Fig 6.40 Spatial patterning in dual flooring

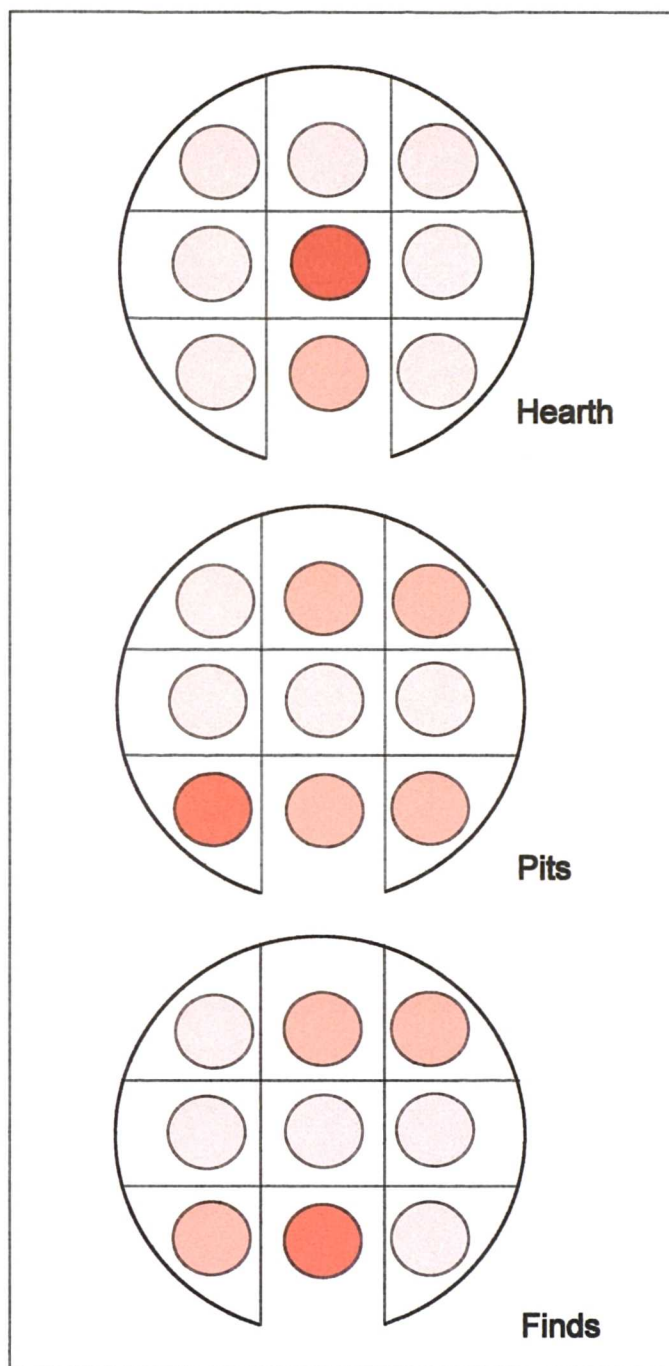


Fig 6.41 Spatial patterning in position of hearths, pits and finds

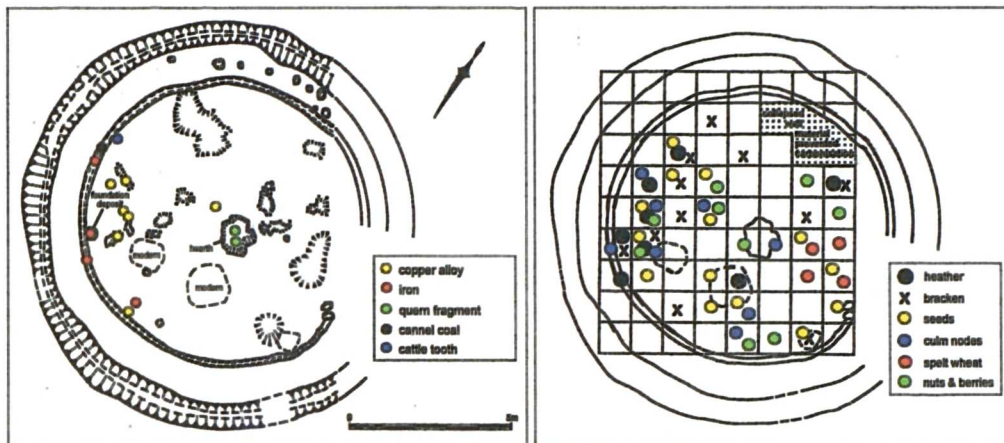


Fig 6.42 Distribution of finds and plant remains at South Shields (after Hodgson *et al.* 2001)

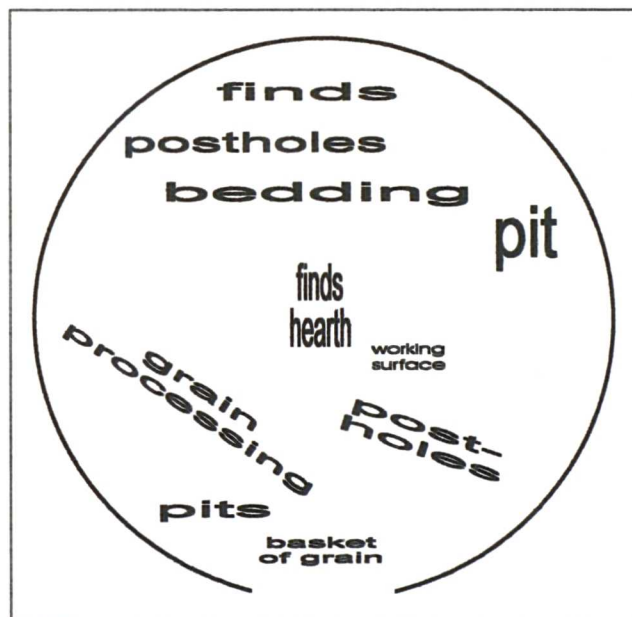


Fig 6.43 Spatial patterning at South Shields

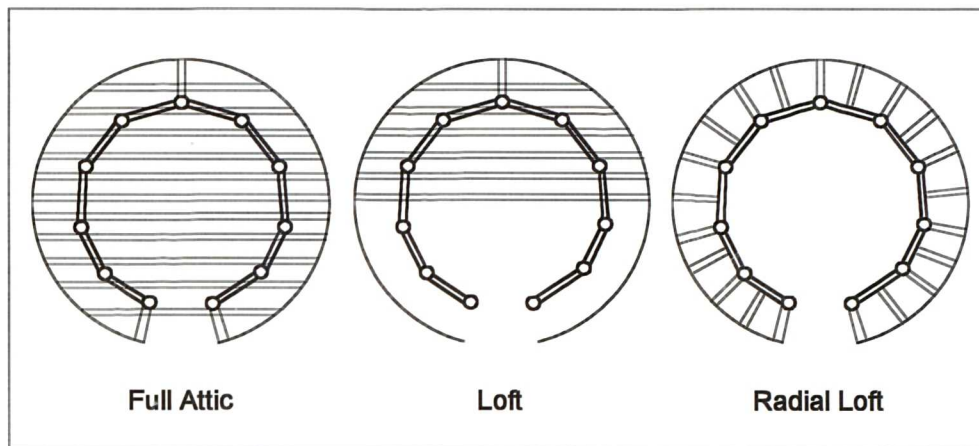


Fig 6.44 Basic frameworks for an upper floor based on the main ring-beam

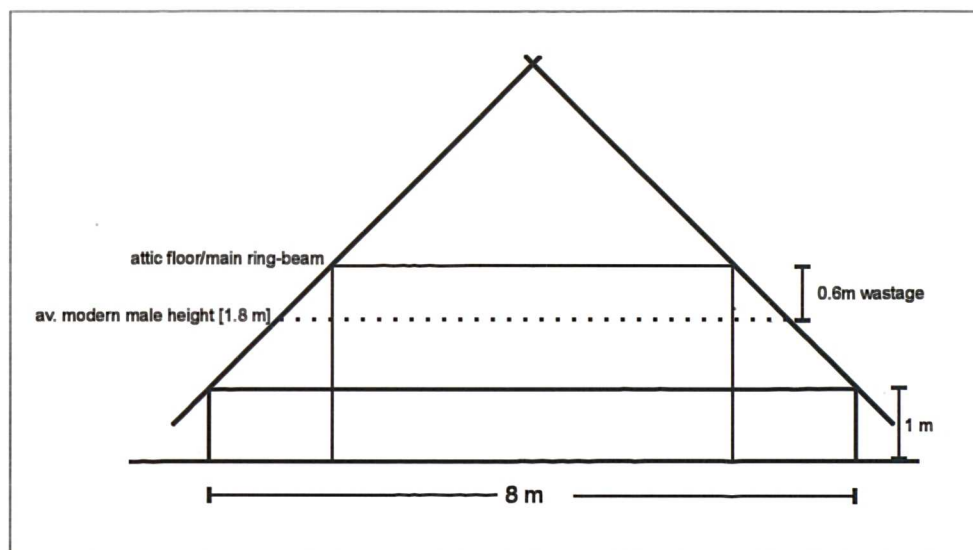


Fig 6.45 Vertical use of space in the average prehistoric structure

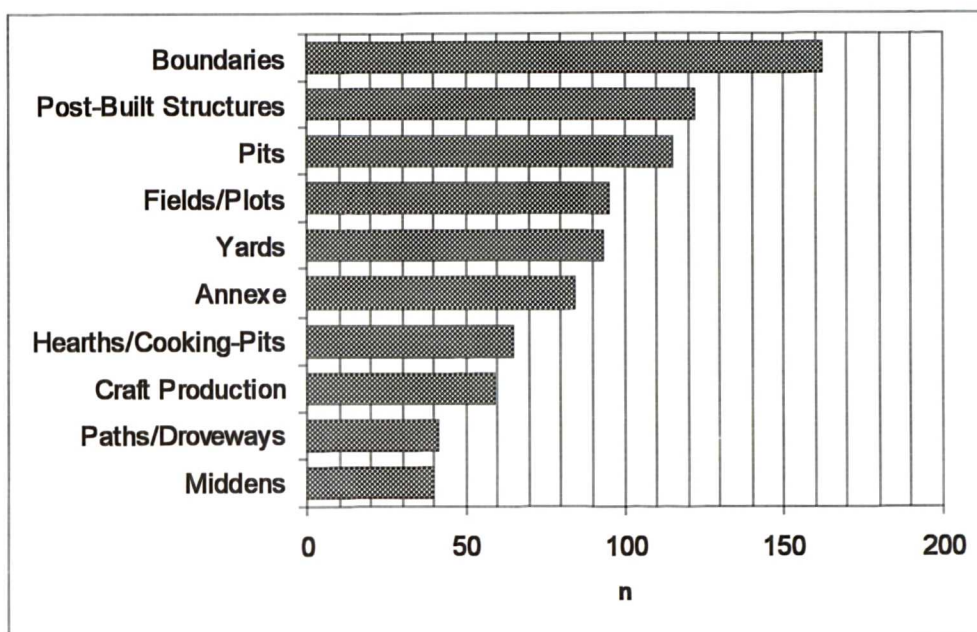


Fig 6.46 Use of external space

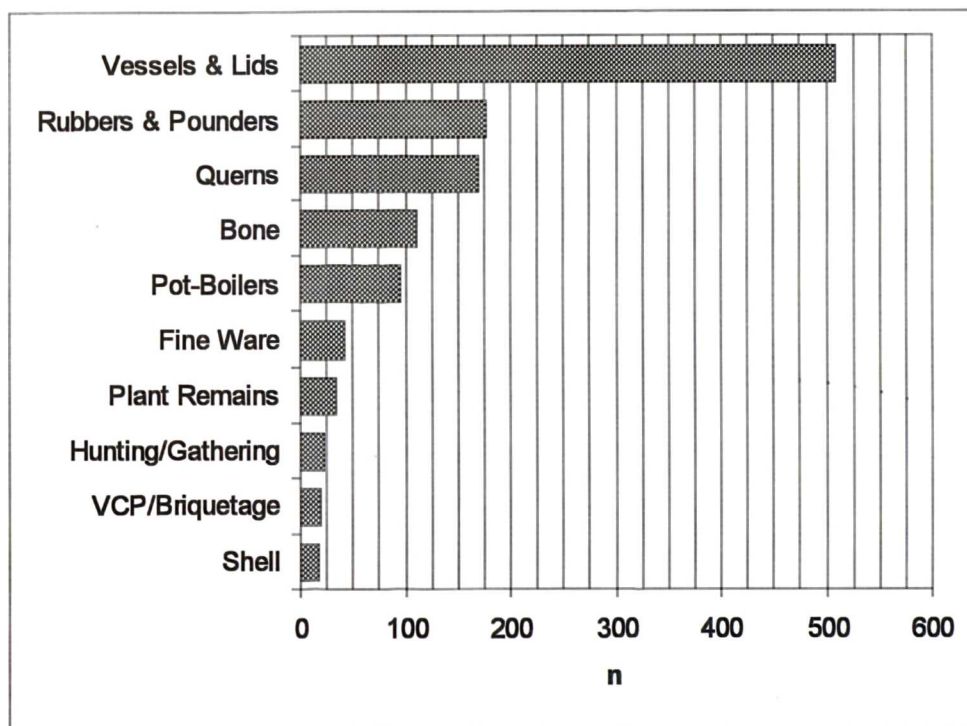


Fig 6.47 Subsistence finds in circular structure contexts

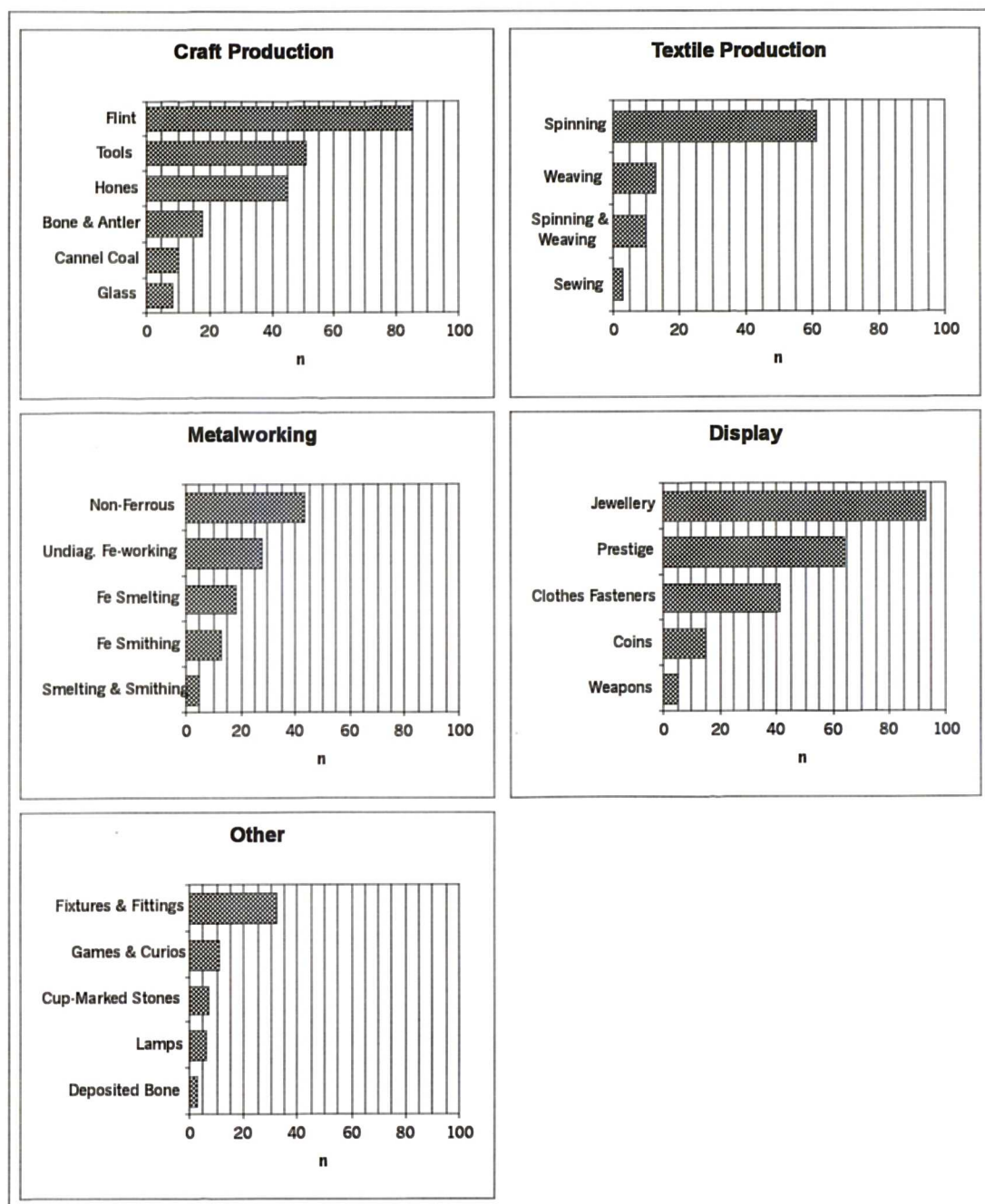


Fig 6.48 Non-subsistence finds in circular structure contexts

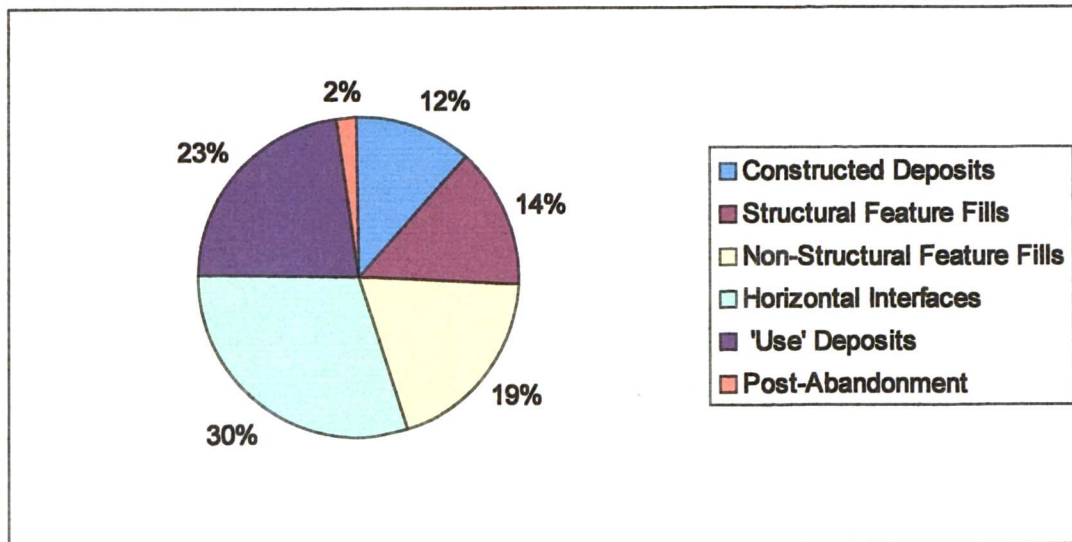


Fig 6.49 Finds context: formation

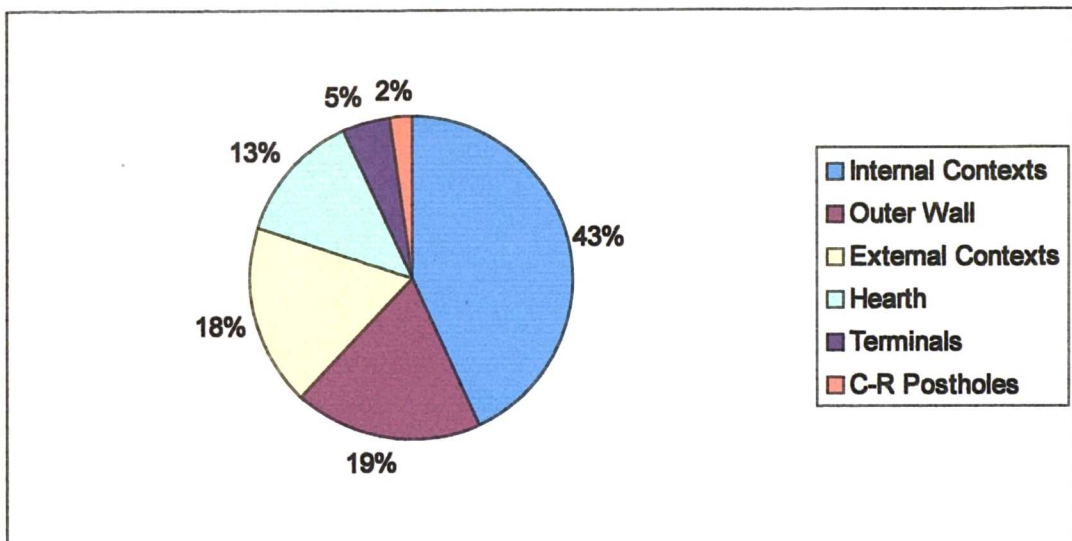


Fig 6.50 Finds context: spatial

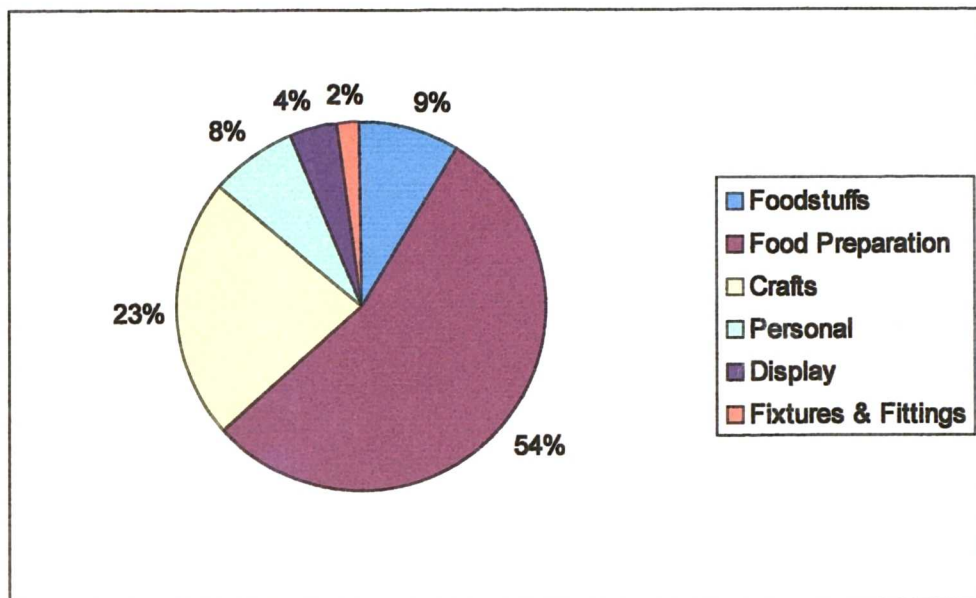


Fig 6.51 Finds Type

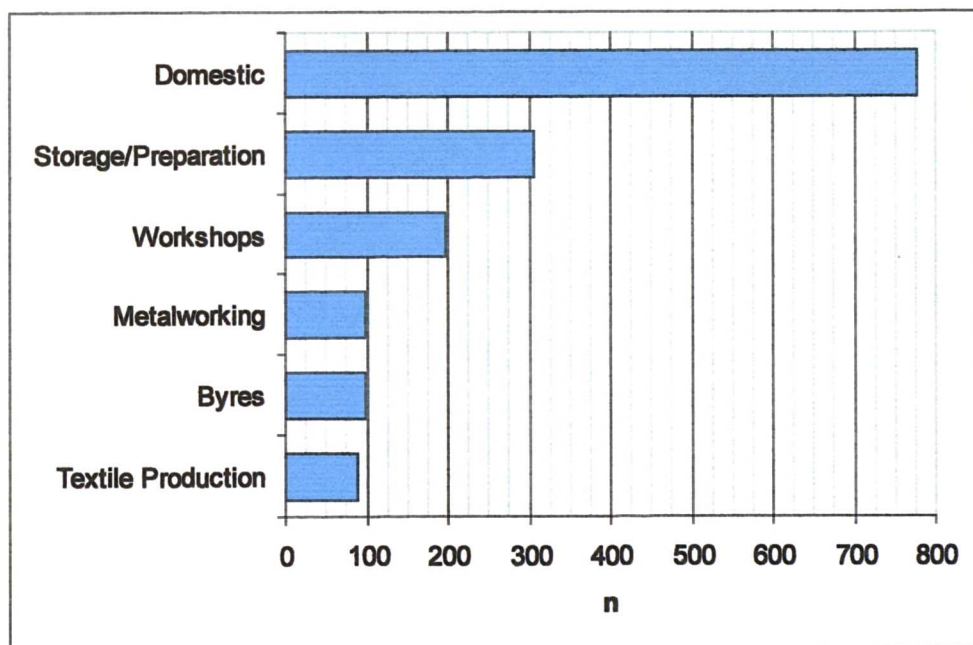


Fig 6.52 Implied activities

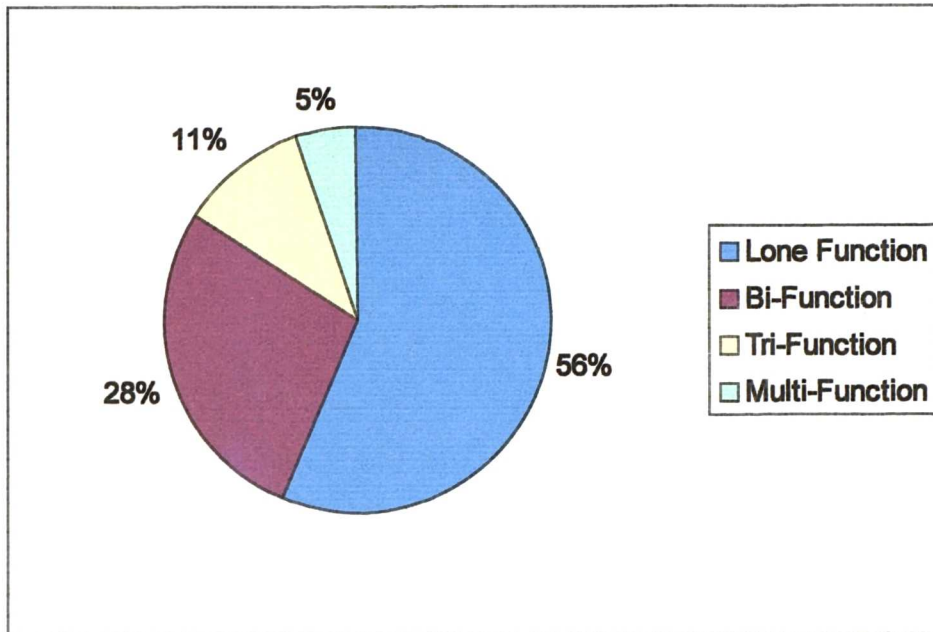


Fig 6.53 Multi-functionality in prehistoric circular structures

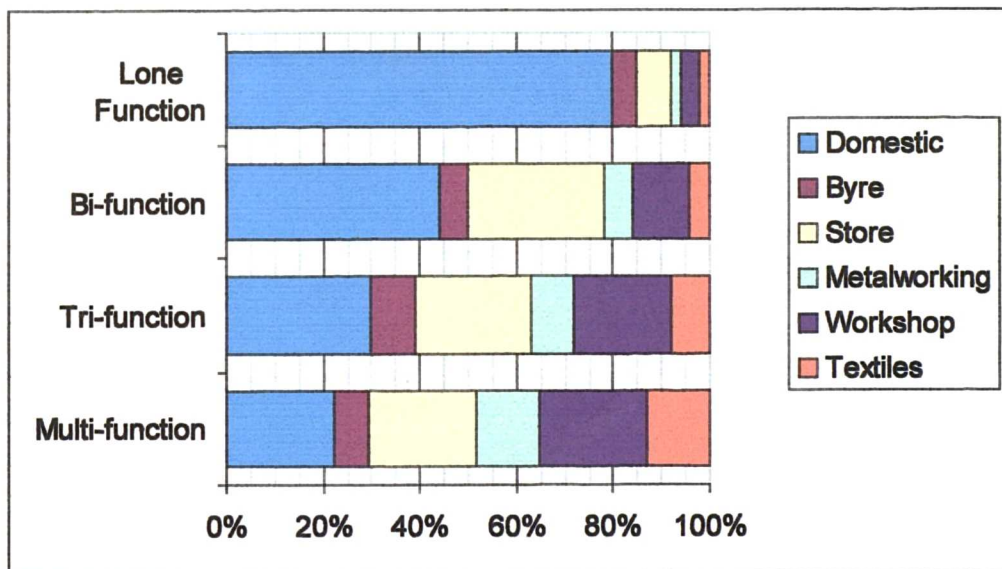


Fig 6.54 Structure function and multi-functionality

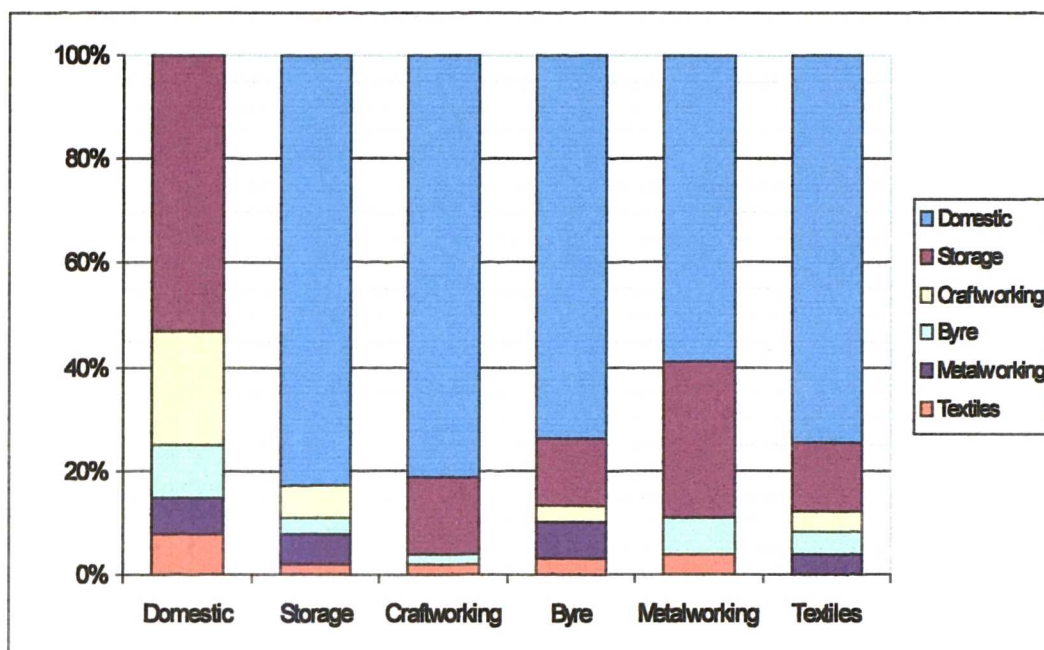


Fig 6.55 Coincidence of finds types

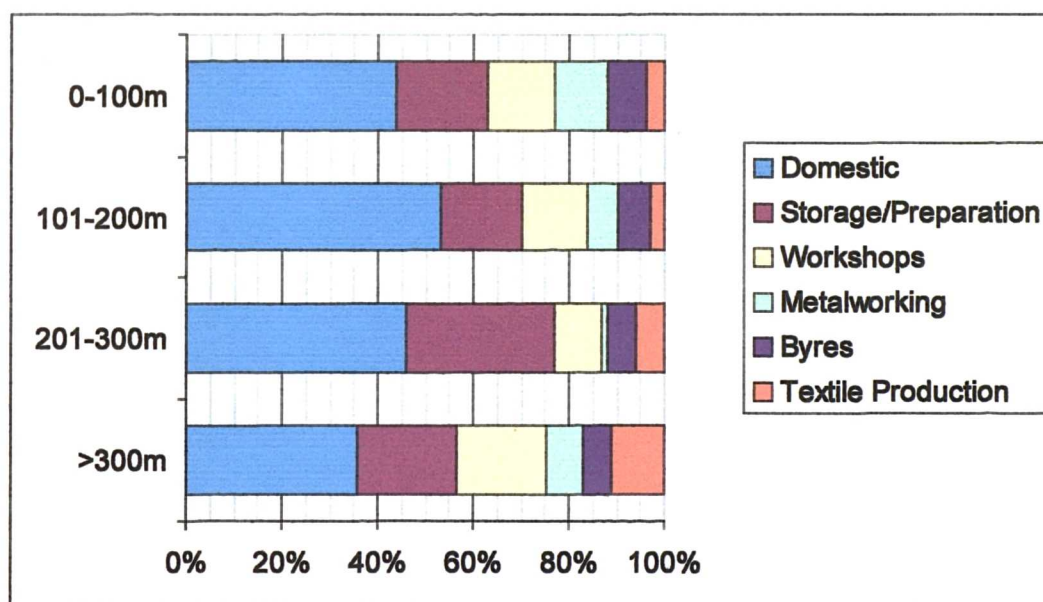


Fig 6.56 Finds type and height above sea level

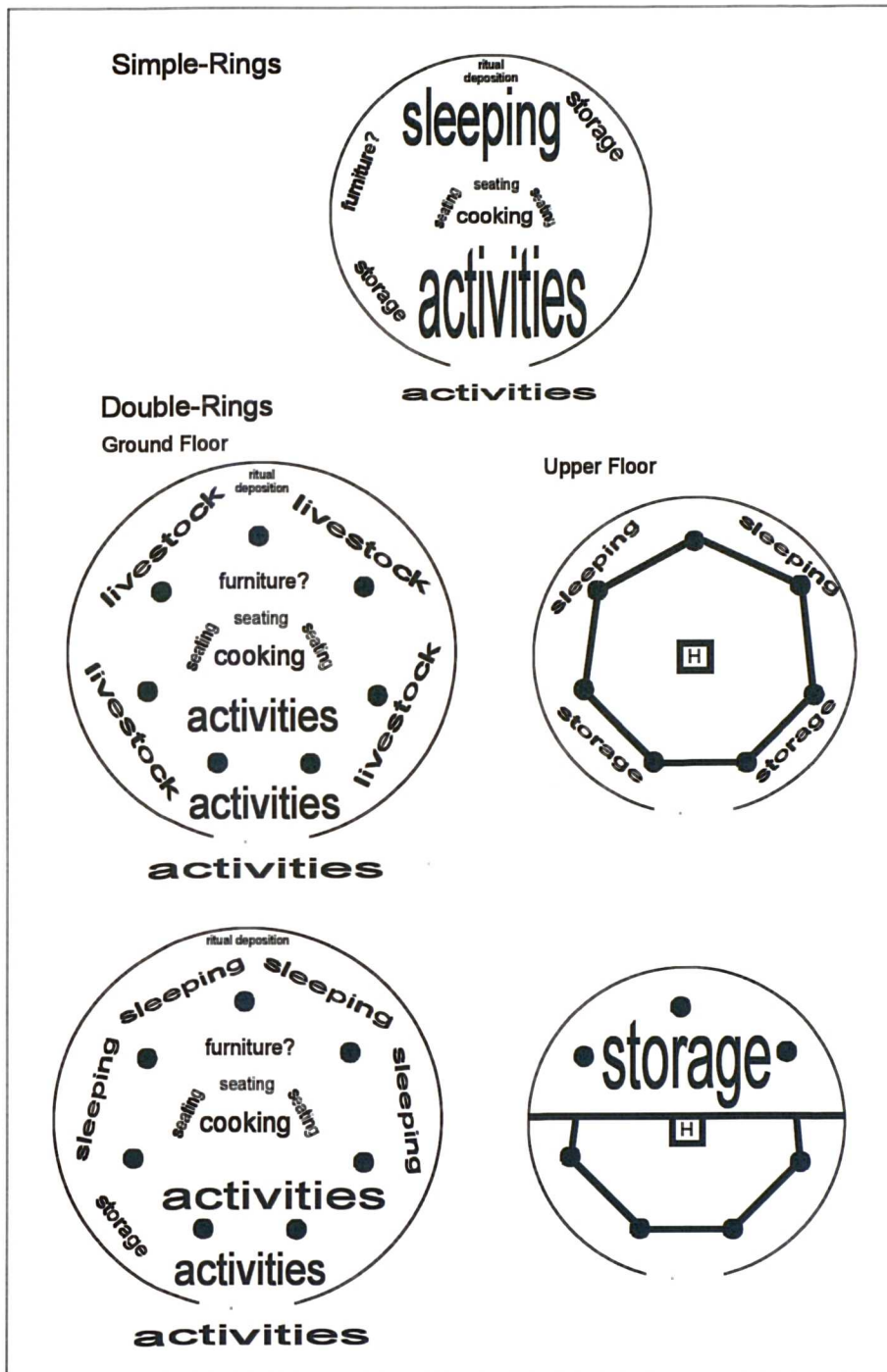


Fig 6.57 Alternative models of the average use of space in prehistoric structures

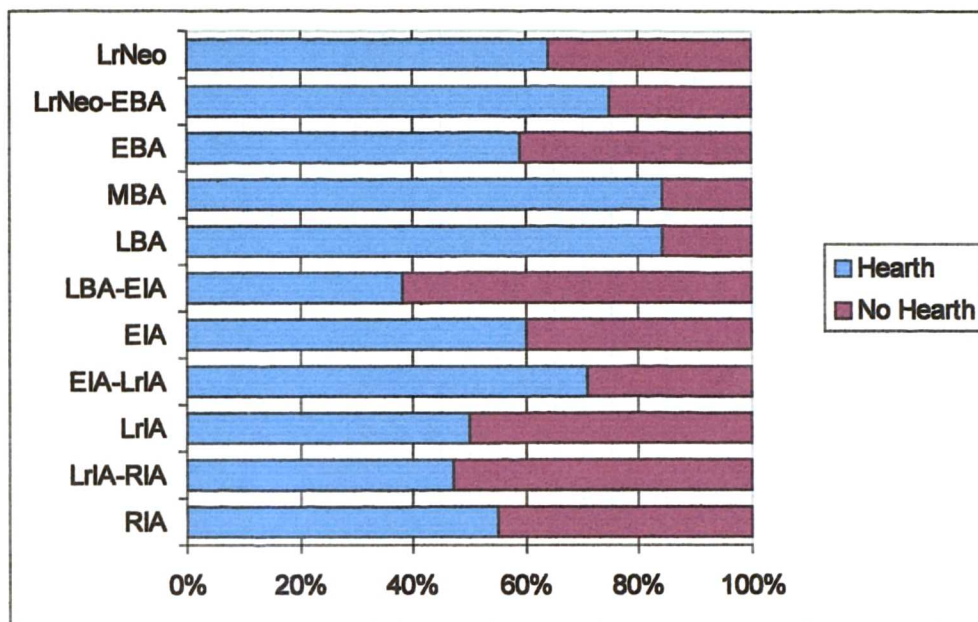


Fig 6.58 Chronological variation in the provision of a hearth

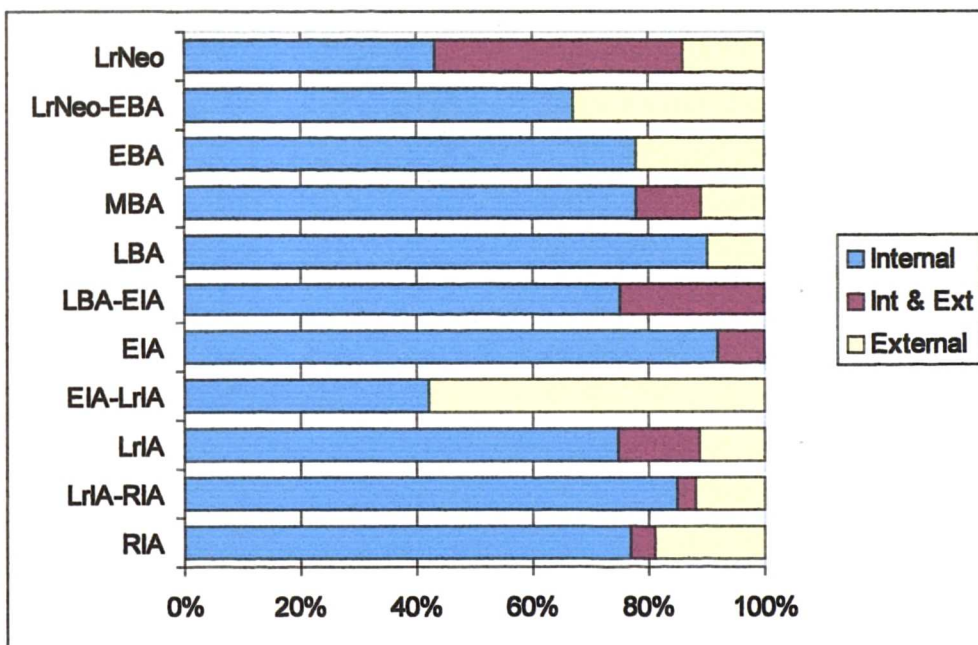


Fig 6.59 Chronological variation in hearth position

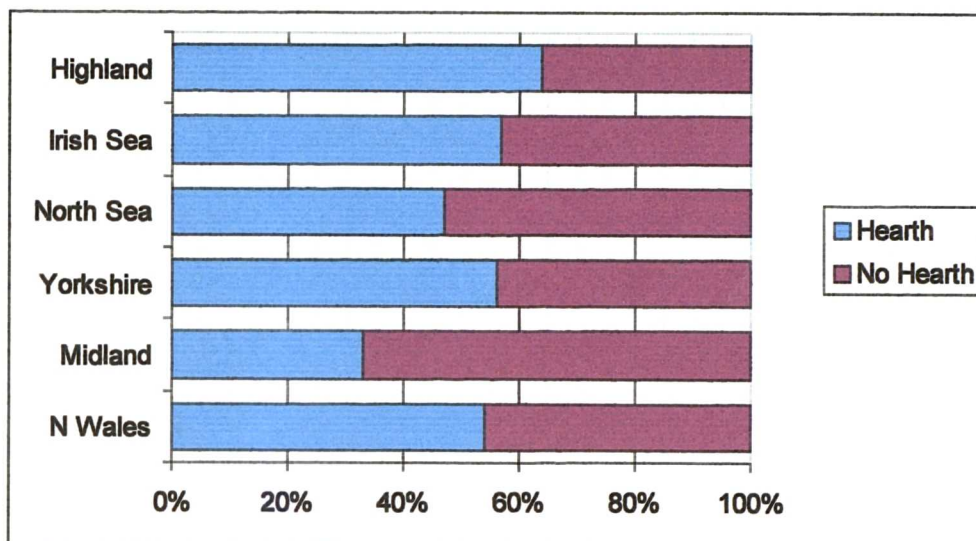


Fig 6.60 Regional variation in the provision of a hearth

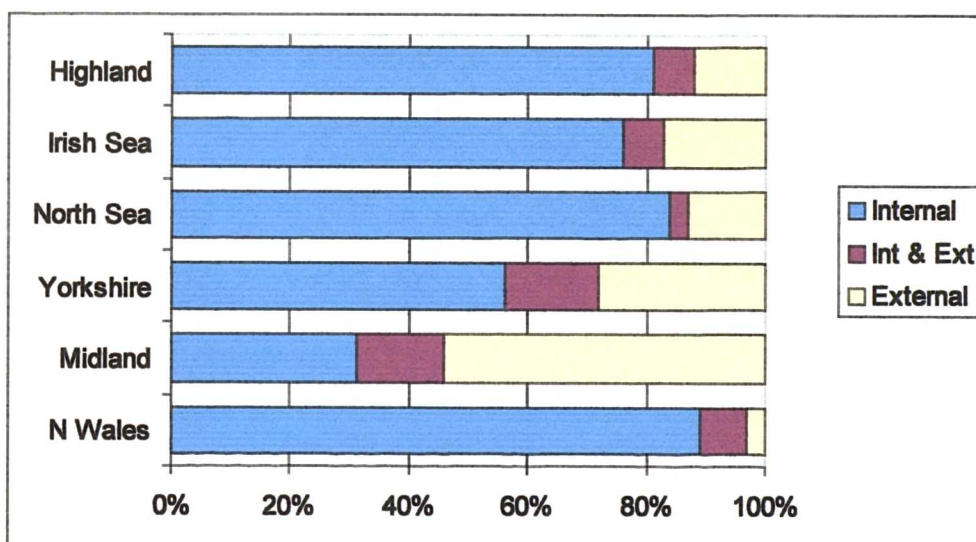


Fig 6.61 Regional variation in hearth position

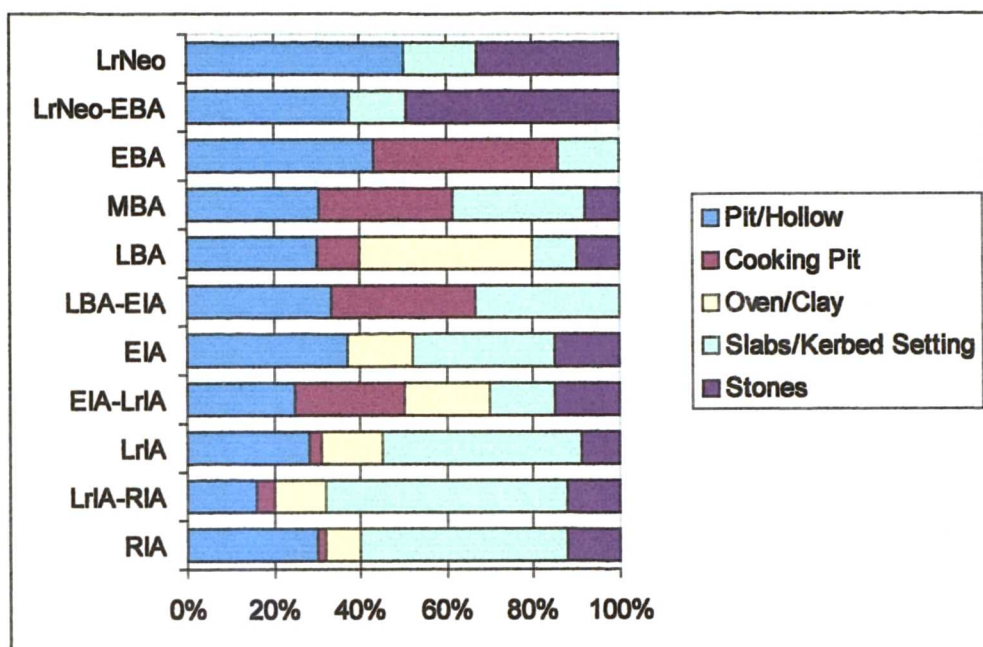


Fig 6.62 Chronological variation in hearth type

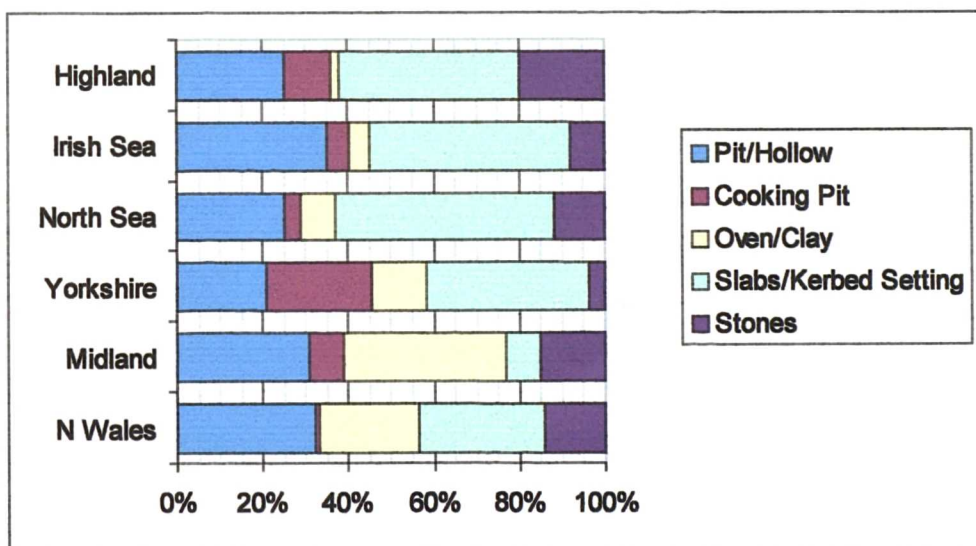


Fig 6.63 Regional variation in hearth type

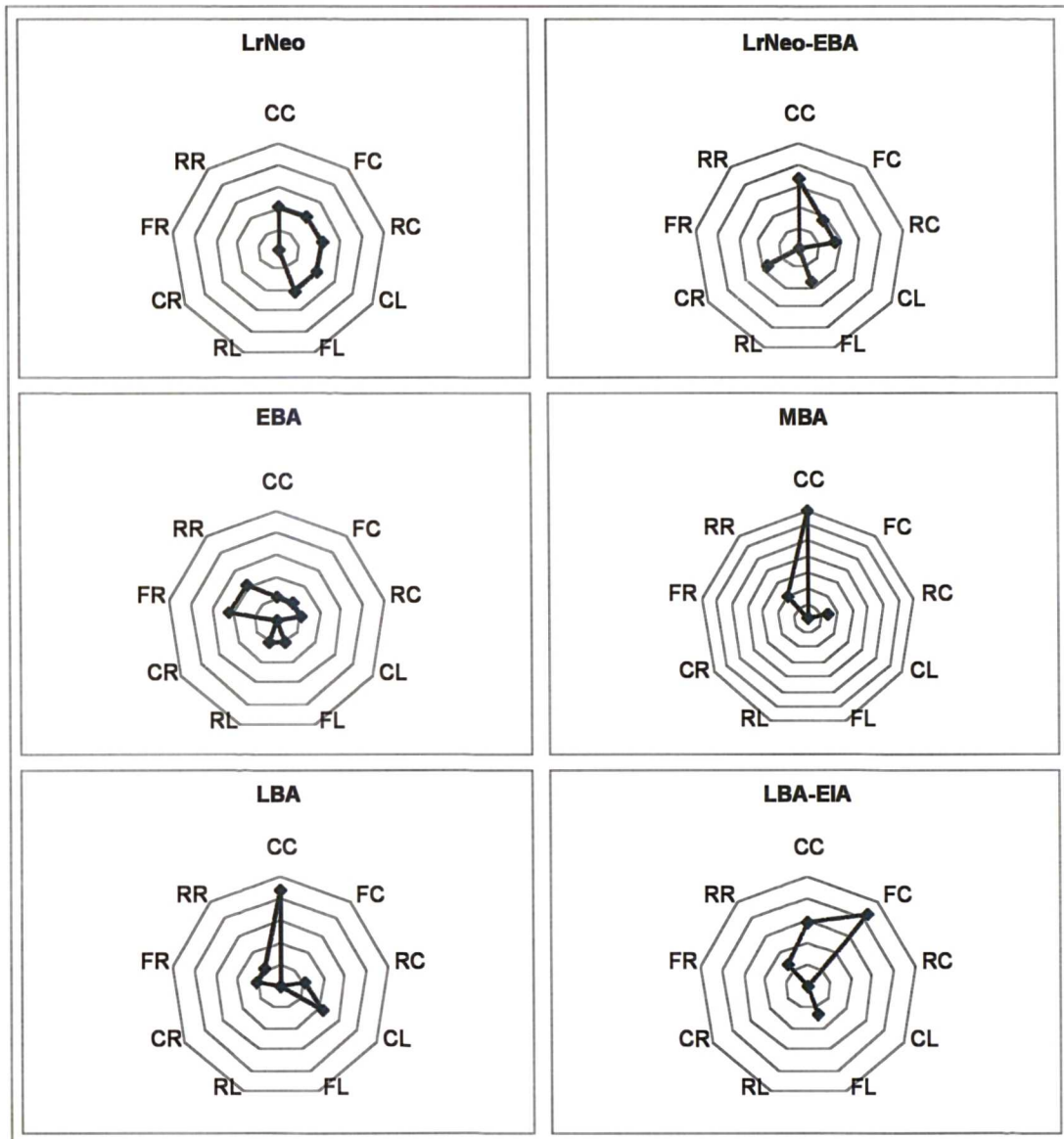


Fig 6.64 Chronological variation in hearth position

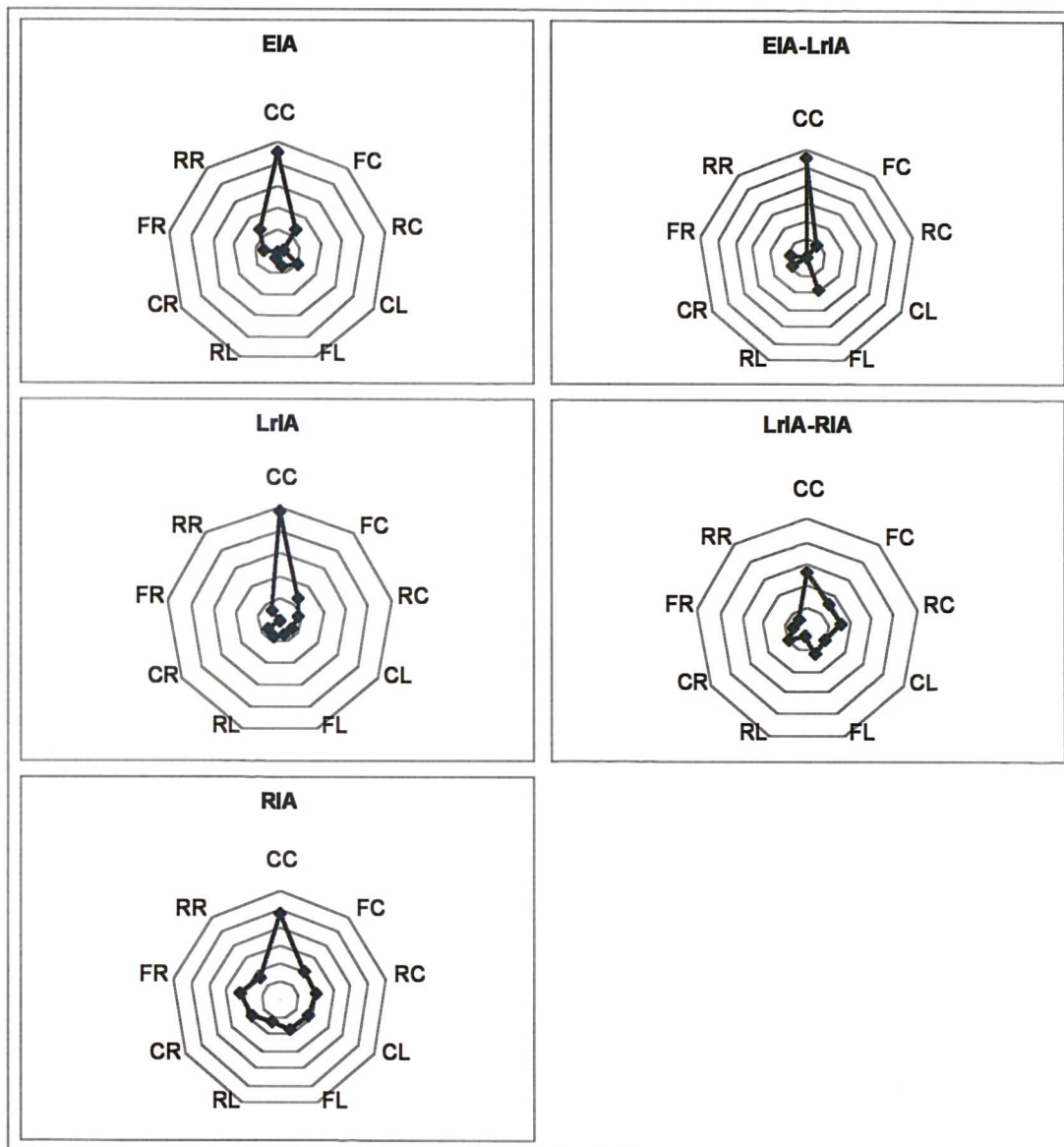


Fig 6.64 continued

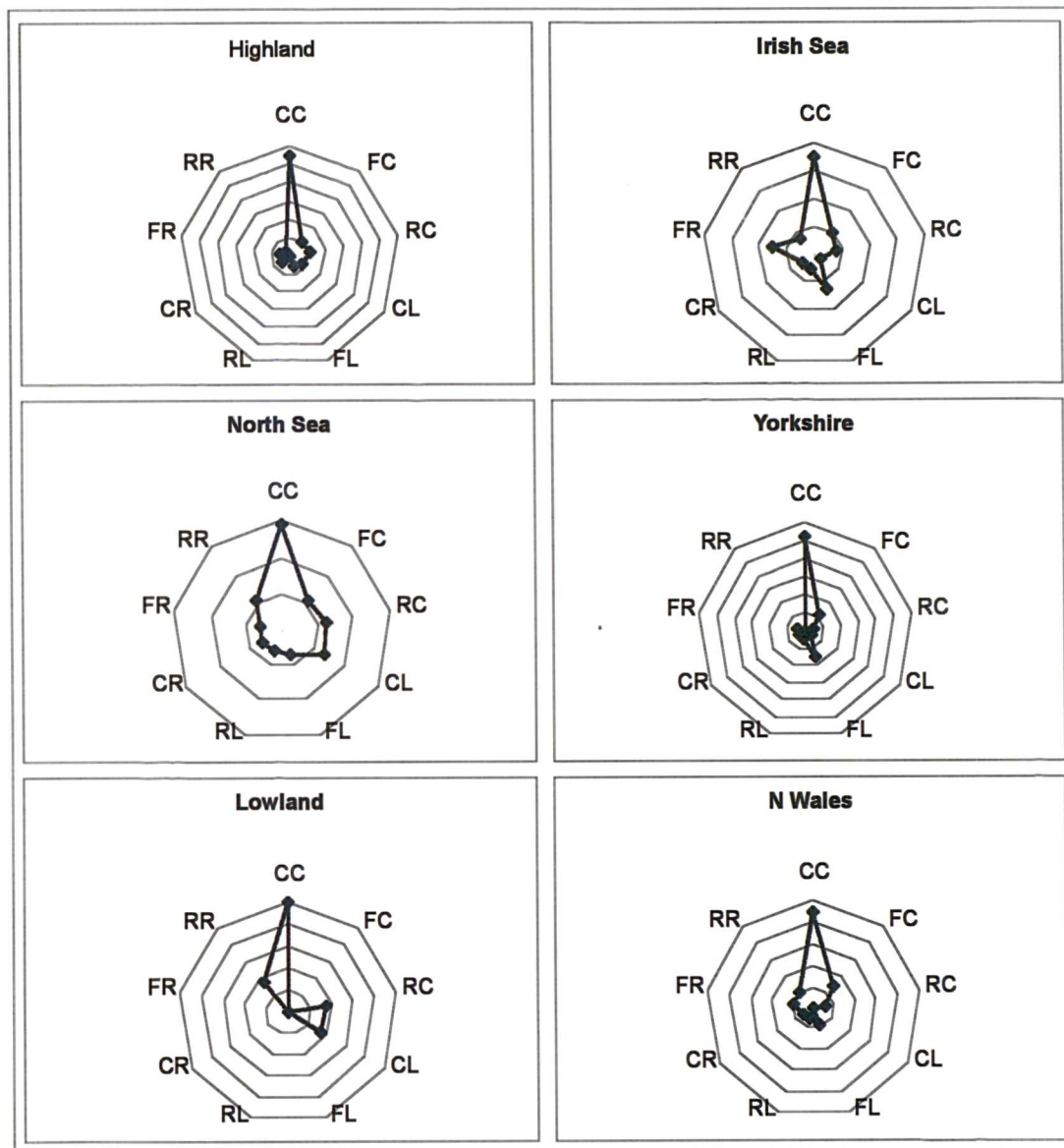


Fig 6.65 Regional variation in hearth position

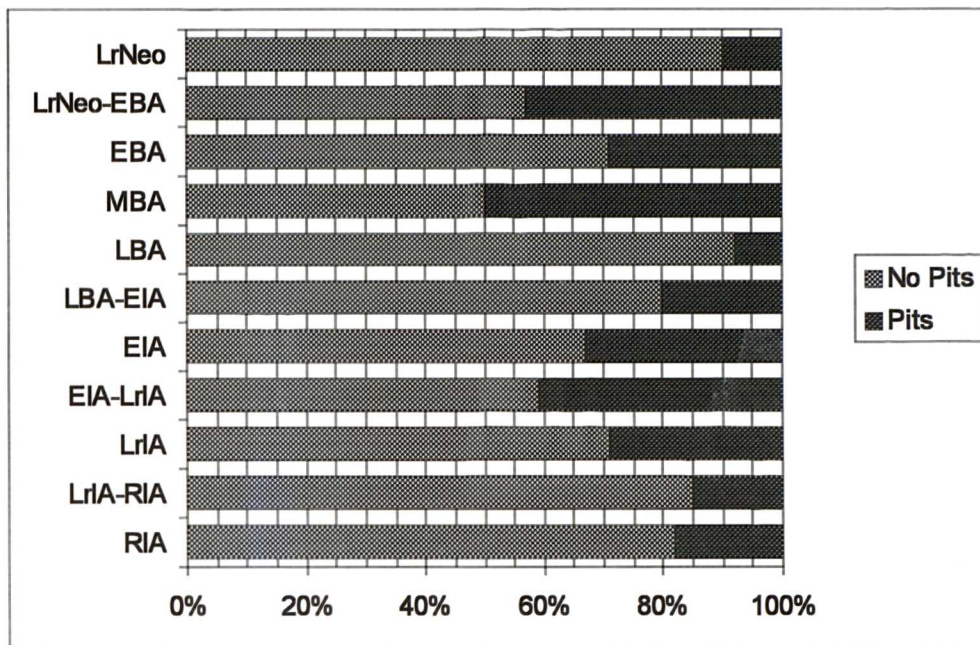


Fig 6.66 Chronological variation in the provision of pits

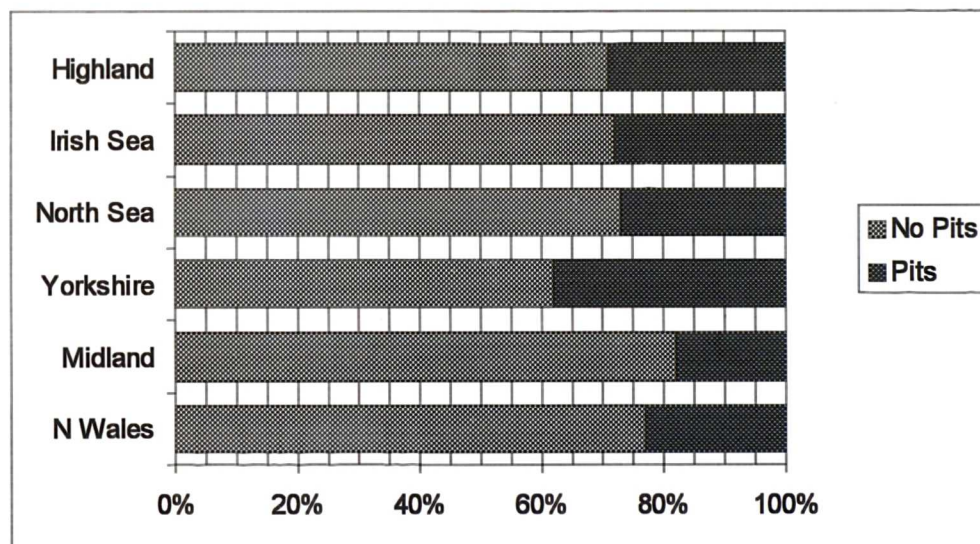


Fig 6.67 Regional variation in the provision of pits

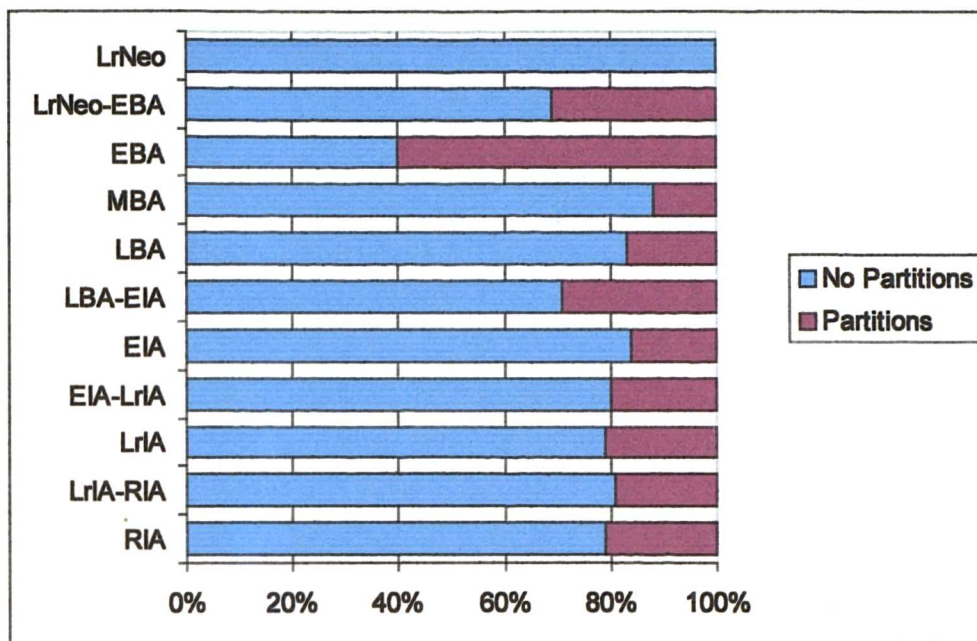


Fig 6.68 Chronological variation in the provision of partitions

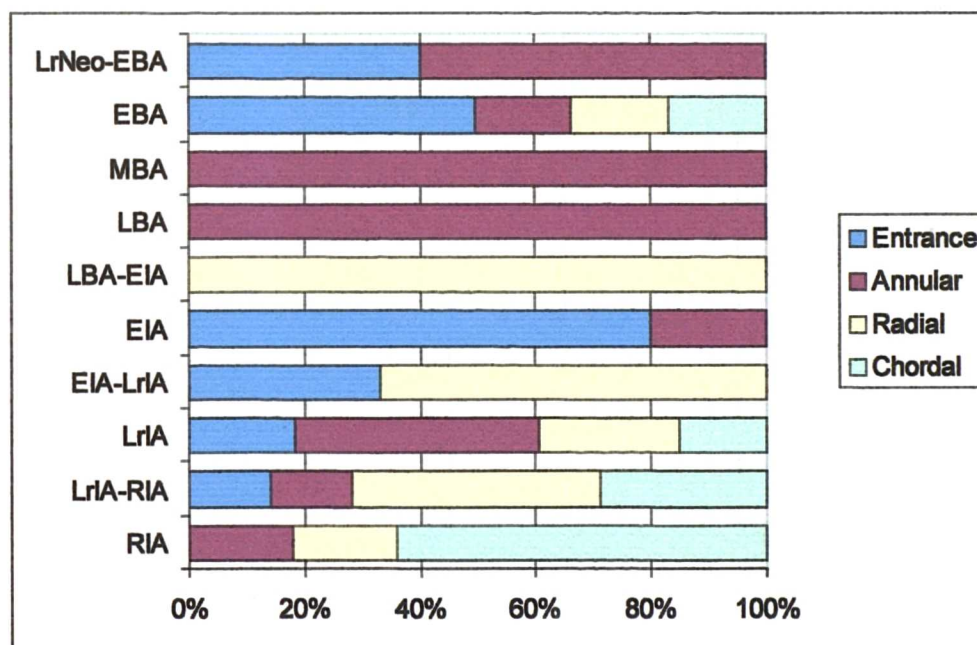


Fig 6.69 Chronological variation in partition type

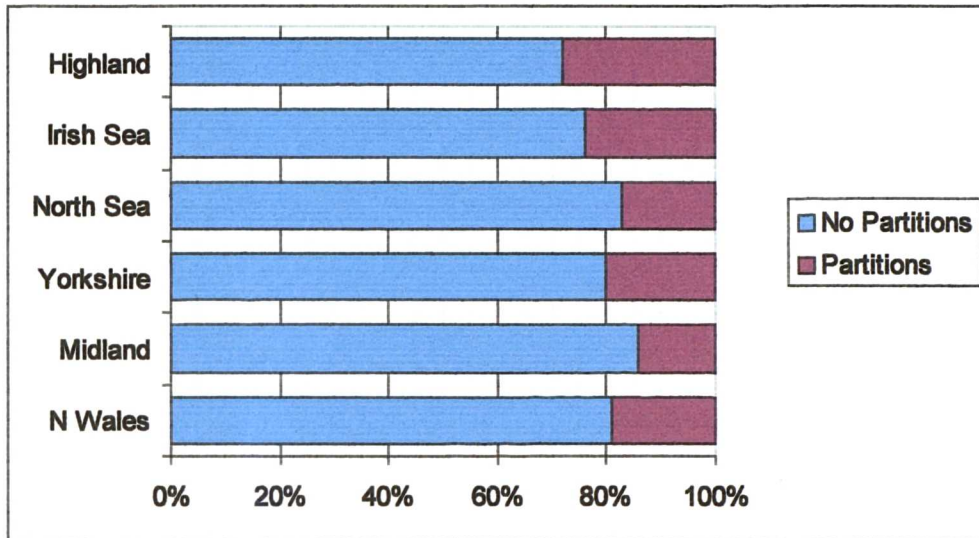


Fig 6.70 Regional variation in the provision of partitions

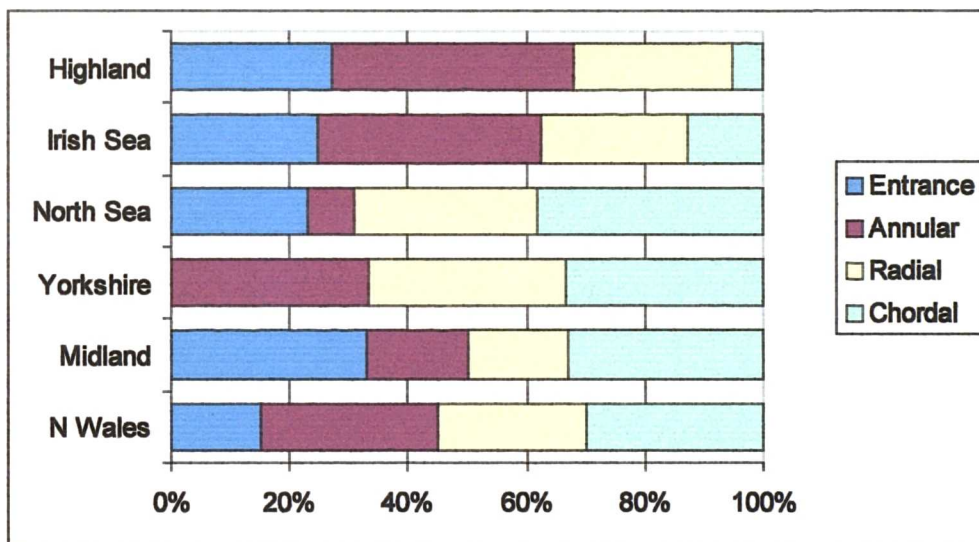


Fig 6.71 Regional variation in partition type

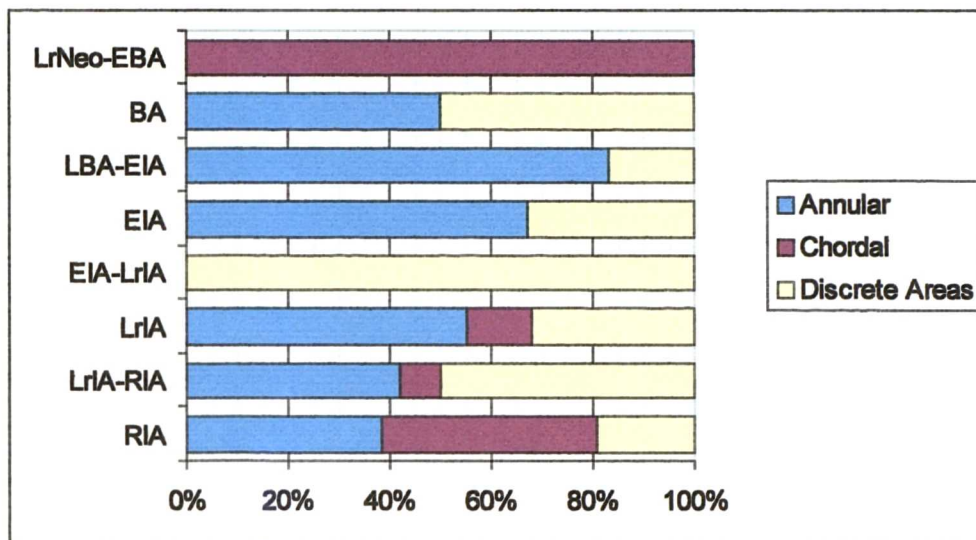


Fig 6.74 Chronological variation of spatial emphasis in dual flooring

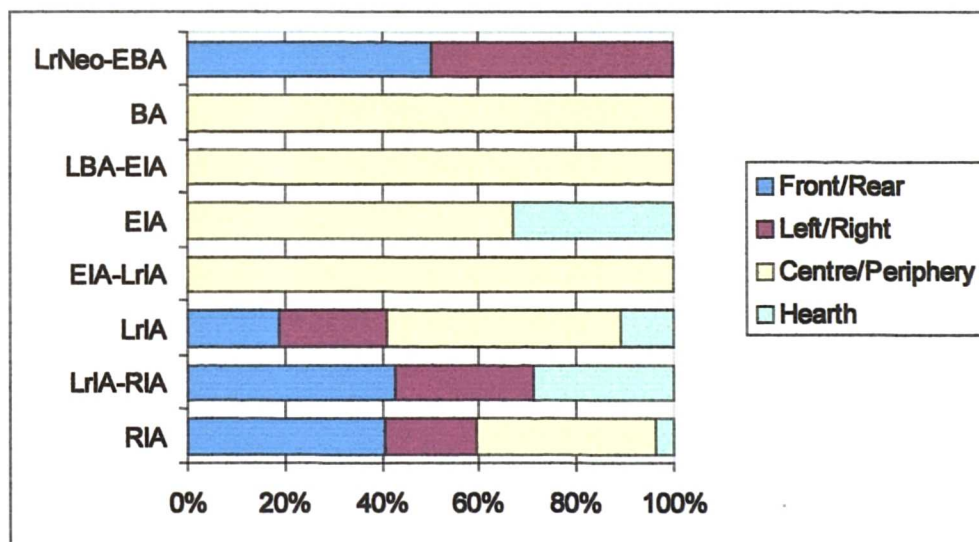


Fig 6.75 Chronological variation in the patterning of dual flooring

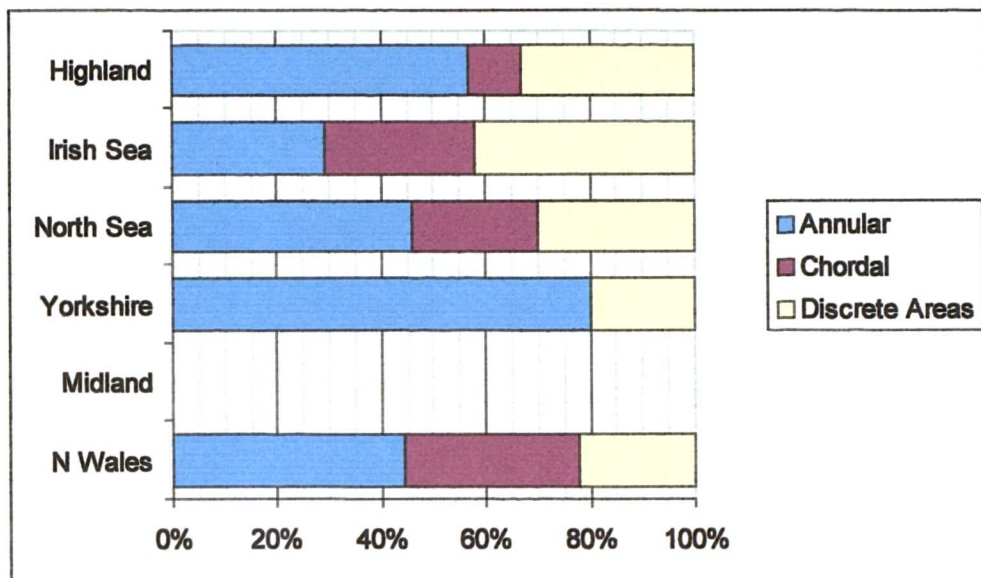


Fig 6.76 Regional variation of spatial emphasis in dual flooring

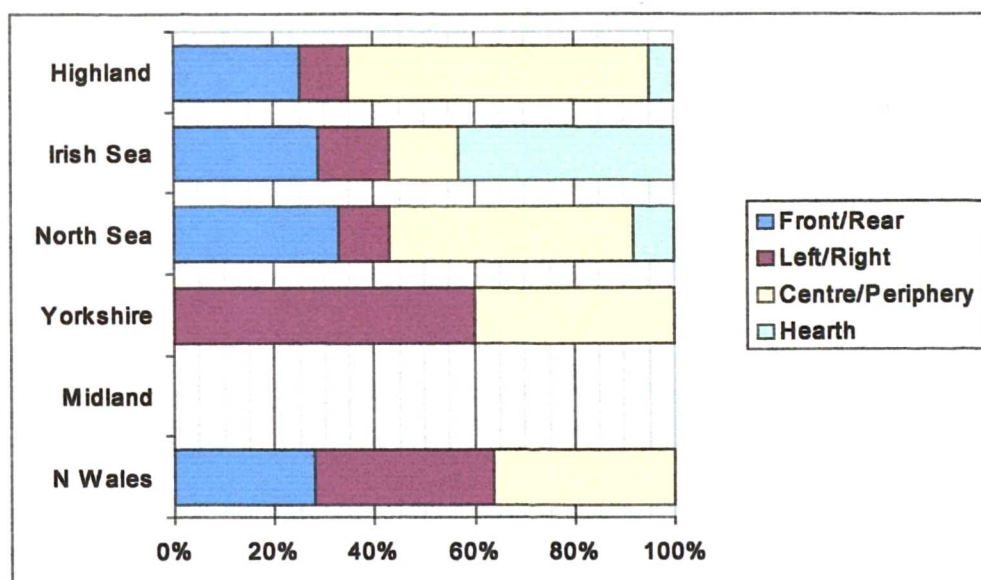


Fig 6.77 Regional variation in the patterning of dual flooring

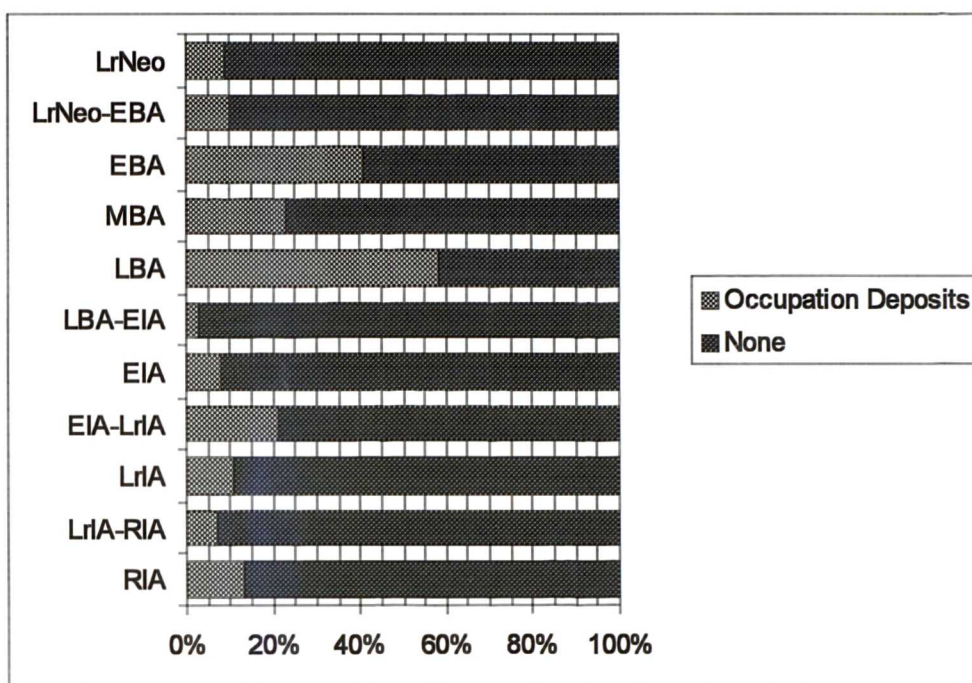


Fig 6.78 Chronological variation in the occurrence of occupation deposits

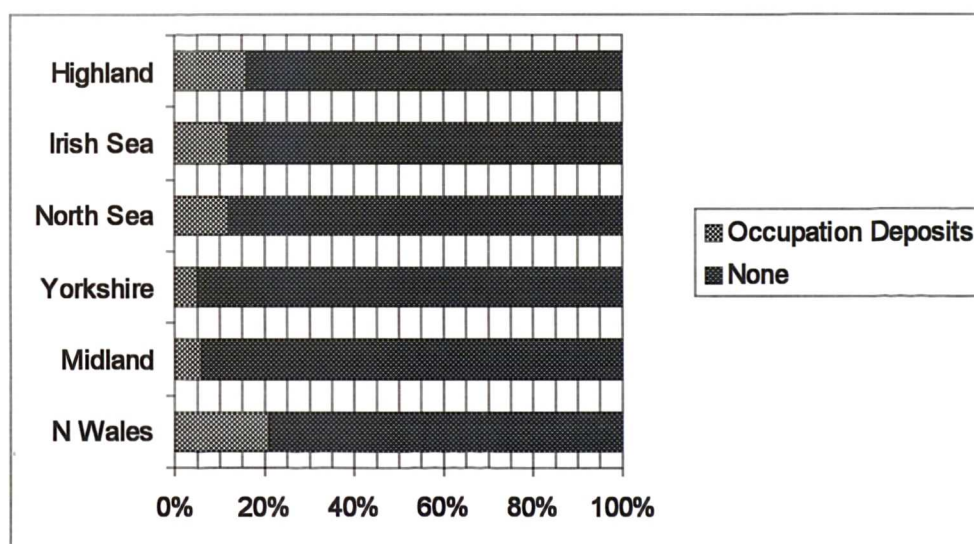


Fig 6.79 Regional variation in the occurrence of occupation deposits

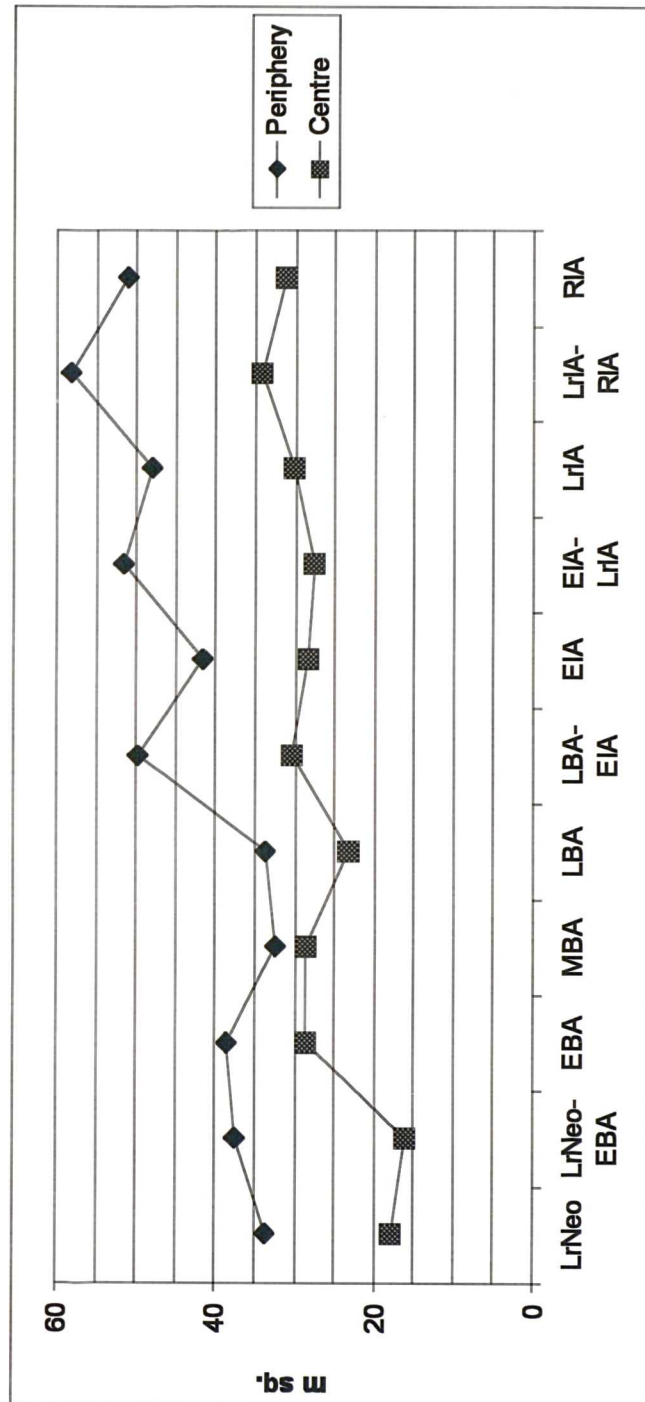


Fig 6.80 Chronological variation in the provision of internal space

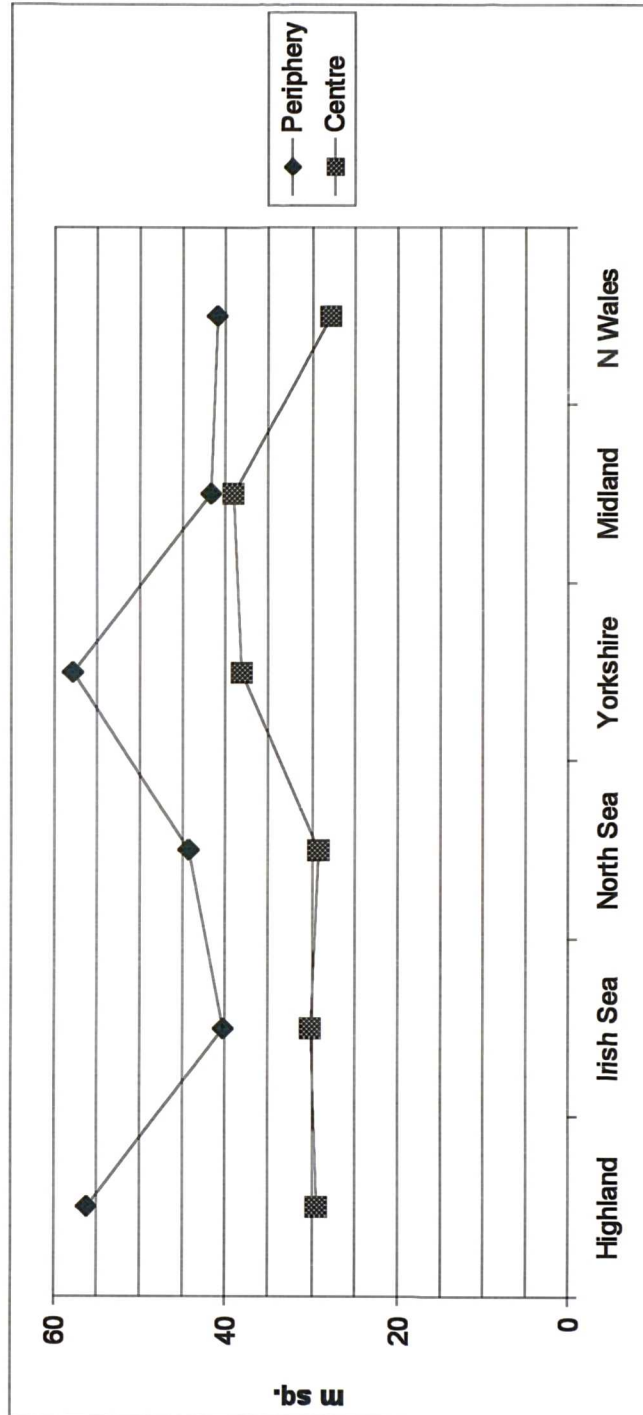


Fig 6.81 Regional variation in the provision of internal space

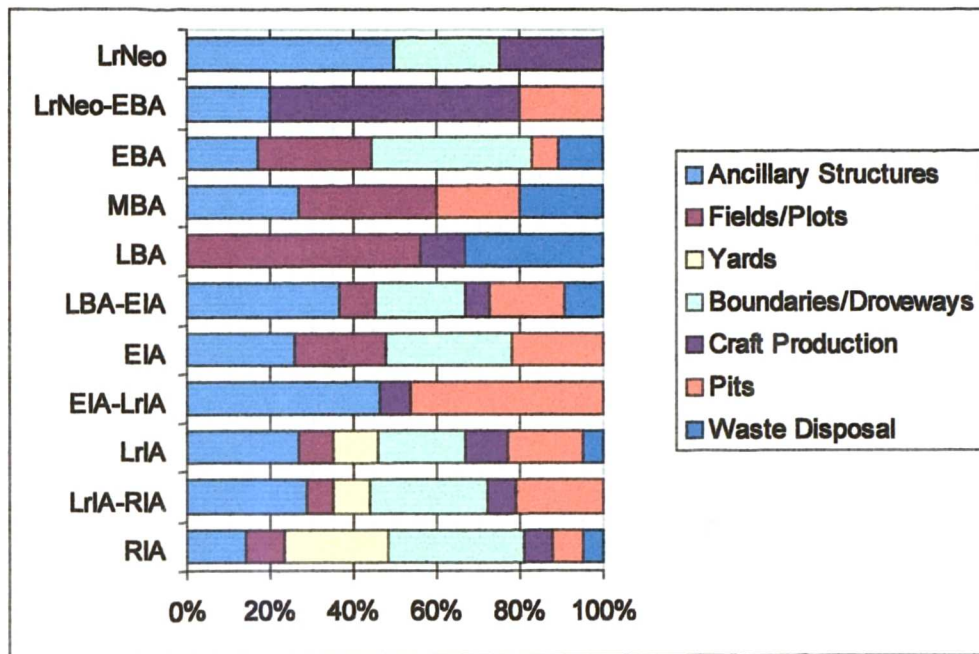


Fig 6.82 Chronological variation in use of external space

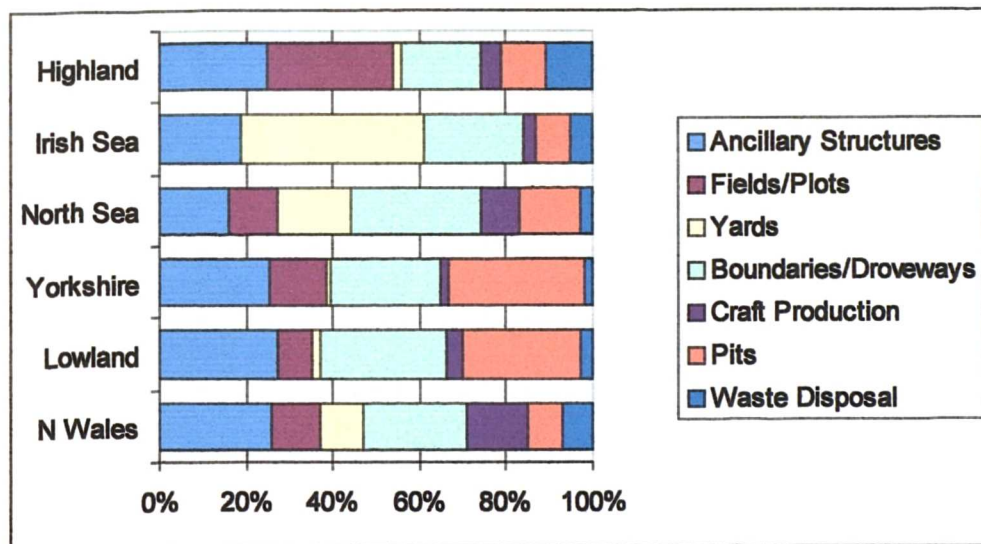


Fig 6.83 Regional variation in use of external space

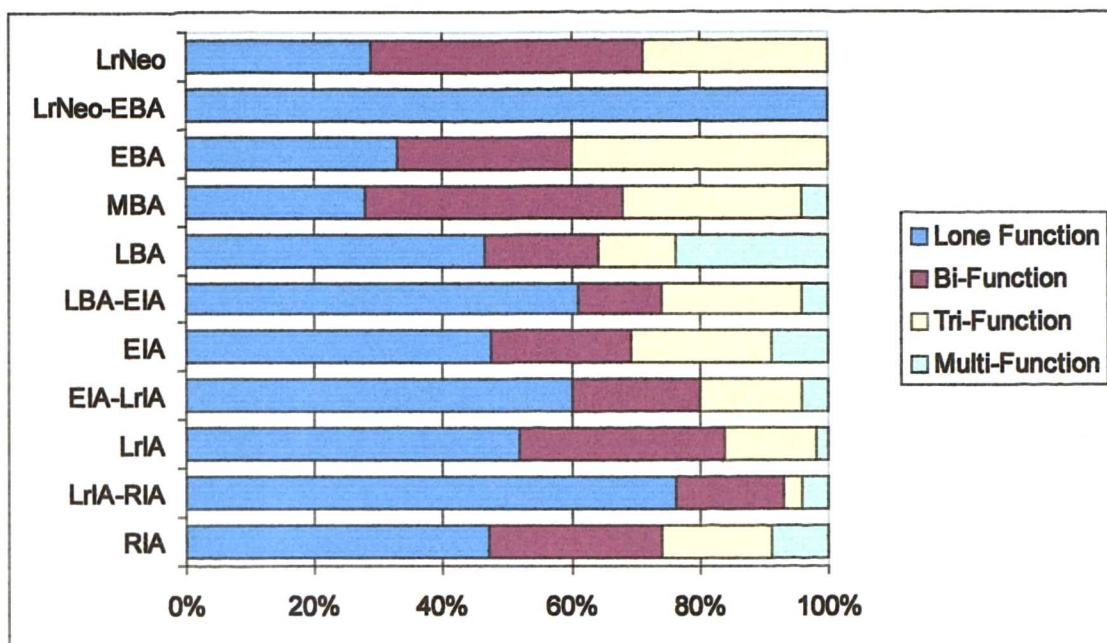


Fig 6.84 Chronological variation in structure multi-functionality

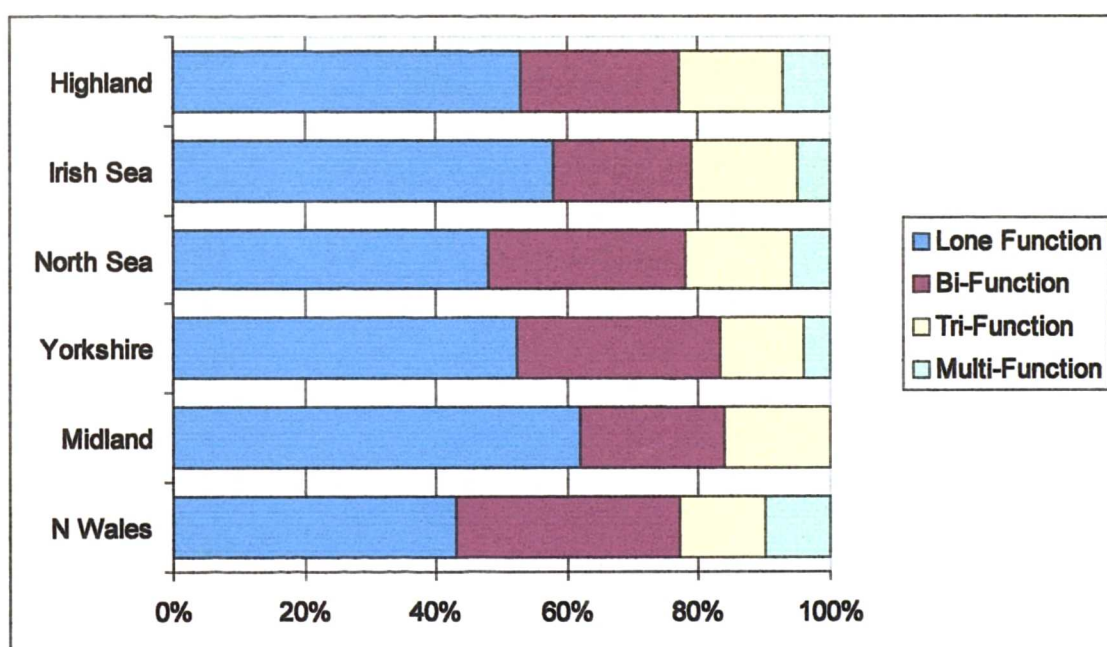


Fig 6.85 Regional variation in structure multi-functionality

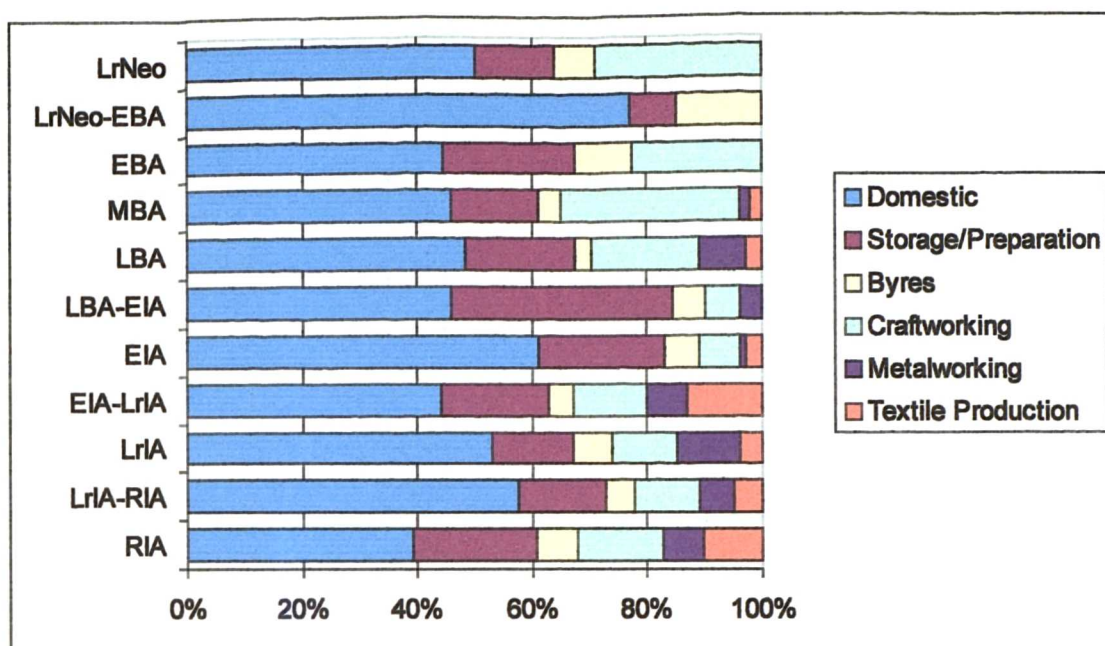


Fig 6.86 Chronological variation in structure function

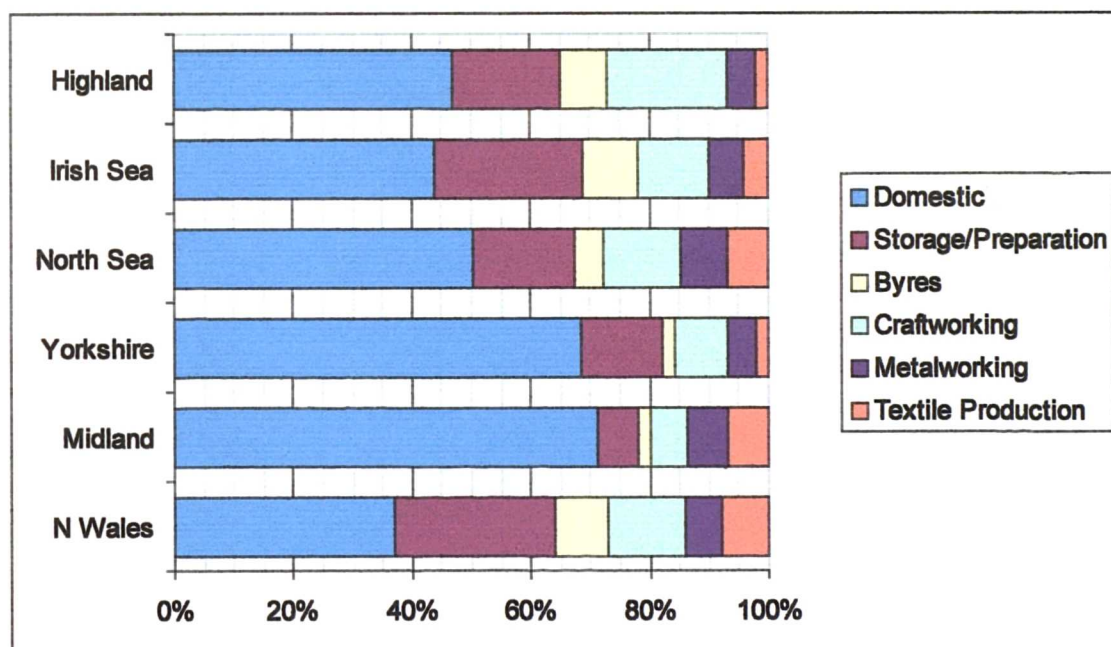


Fig 6.87 Regional variation in structure function

Chapter 7 Maintenance

**"The functional life cycle of individual structures is connected both to
processes of structural decay and to changing social conditions"
(Cameron 1991, 170)**

7.1 Introduction

How long is it before a circular structure needs to be repaired? What is the structural lifespan of a structure and how long are they typically used for? Is such use seasonal, episodic or permanent and how does that affect lifespans? What influences the decision to rebuild rather than to repair? In an attempt to look at these issues this chapter will address the topics of maintenance activities and structure lifespans by assessing evidence from the archaeological record alongside information from wood microbiology, ethnoarchaeology, and experimental archaeology.

7.2 Maintenance

An existing house is periodically evaluated in terms of condition and the decision is made regarding the need for either repair or replacement (Brooks 1993, 179). In this section we will discuss the evidence for both structure repair and rebuilding activity. It is assumed that repair to structures takes place as a result of timber decay or structural failure. Such activity was not found to be necessary until eight years after construction at Reynold's *Pimperne House* (Reynolds 1993). The rebuilding of a structure takes place when decay and/or structural failure are advanced and when cultural tradition dictates.

7.2.1 Repair

Timber Repair

Archaeological evidence for repair can take the form of replacement of individual posts in timber houses or, for example, the addition of a buttress against a stone wall. Individual rotten wall timbers could have been replaced whilst the rest of the building remained standing (Reynolds 1995, 23) – hence the concentric positioning external to the line of the wall-slot in CS 1, CS 3 and CS 8 at Dalton Parlours (Wrathmell & Nicholson 1990, 279). Repair of individual roof supports can also take place independent of a re-roofing episode. At Lintshie Gutter Plat 5, the gently sloping edge on one side of the repair postholes shows how the post may have been chocked into the roof beam and pushed from the bottom into an upright position

(Terry 1995a, 385). 168 circular structures in north and central Britain – 26% of those with a timber element – have possible or definite evidence for structural repair as visible in plan (fig. 7.1). A further 46 structures have enlarged postholes – 50% larger than the prehistoric average – which might also be seen as evidence for repair (Reynolds 1993). It is possible that repair activity is under-represented as a replacement post may utilise the same cut feature as the original post, thereby leaving no secure archaeological trace (Jobey & Jobey 1987, 167).

Repair is traditionally taken as evidence for structure longevity. Jo Brück found that only one in five Middle Bronze Age structures (18%) had evidence for repair (Brück 1999b, 146). This led her to recognise the dominance of the *single-generation model* in the period where the majority of structures are abandoned after just one generation of occupation. Bersu (1947-48a) suggested, however, that repair may represent the effects of short-term abandonment and the need for repair upon re-occupation. As such – rather than being an indicator for longevity – repair may actually be an indicator for a duration of occupation shorter than that provided by the natural decay of a constantly inhabited timber structure (*ibid*, 258). Repairs still indicate occupation beyond the limit of natural timber decay. The crux of the argument becomes whether that decay occurs naturally alongside continuous occupation or whether it is speeded up by short-term, winter abandonment.

Evidence of repairs to less-durable stakes as opposed to those of post-built walls was found to be just 7% above the expected norm. Stakes decay more rapidly than larger posts and as such a much higher repair figure was expected. The 7% figure implies that stake-built structures were not repaired as often as their post-built counterparts. Perhaps then, stake-built structures in particular were *expected* to be of short duration. Of those wall-slot structures with evidence for plank-wallings (just eight structures), three (38%) revealed evidence for repair/rebuilding activity. Because of their decreased breadth, planks are less durable timbers, therefore we might again expect increased evidence for repair. The figure was the average, however, again suggesting that house characteristics were selected according to the expected duration of use.

Hut-Circles

Only 7% of structures without a timber element have evidence for repair (fig. 7.2). This could be because few hut-circle excavators have tackled the issue of wall construction, meaning that potentially distinct phases of maintenance activity may go unrecorded. Discussing the evidence from Tormore (Arran) and Kilphedir (Sutherland) Stevenson suggests that: "it may have been a common practice to refurbish hut circles, and thus what appears to the field-surveyor as a comparatively simple structure may have a complex constructional history" (Stevenson 1984, 158). At Cùl a'Bhaile (Argyll), the refurbishment of the house wall led to the doubling of wall

thickness and Stevenson suggests that broad walls may indicate a long period of occupation (*ibid*). At the *Conderton House*, it was found that a drystone wall of less than 1 m in width could successfully hold the weight of a 6.1 m diameter roof (Reynolds forthcoming). More than one in four structures have a wall width in excess of 1.5 m. This might suggest that there is much scope for stone wall excavation to reveal maintenance activities.

This lack of hut-circle repair might also indicate that such structures were only occupied for short durations. Strat Halliday (forthcoming) has recently suggested that upland structures in Highland Scotland were occupied for as little as five years prior to abandonment in a highly mobile settlement system. As with timber structures, evidence for refurbishment and re-roofing activity may indicate longevity but may also be an indicator for episodes of abandonment. A number of separate (seasonal) occupations could produce the same archaeology as short-term continuous occupation. Unless abandonment is prolonged and a turfline develops prior to re-occupation; we have no secure way of identifying punctuated occupation archaeologically, other than perhaps in excessive maintenance activities which may reveal the effects of (winter) abandonment.

7.2.2 Rebuilding

A house can be said to have been rebuilt when *all* of the structural elements have been replaced with only the slightest shift in ground plan. For this study, structures were only accepted as rebuilds when it could be confidently stated that the later structure was not simply the result of chance overlap in a palimpsest of features. 118 structures - one in seven (17%) of those with a timber element - were rebuilt in their entirety (fig. 7.1). 30 of these structures (25%) had evidence for repair *and* rebuilding activity - implying that rebuilding took place as a result of advanced decay - whilst three out of five rebuilt structures had no evidence for repair. This could mean that these structures were rebuilt on the first sign of decay. Alternatively, it could reveal rebuilding upon reoccupation after a short duration occupation was succeeded by a period of abandonment; which led to accelerated decay.

Only 4% of structures without a timber element were rebuilt (fig. 7.2). As with repair this may indicate the more subtle nature of the evidence - a wall may be taken down and rebuilt with no archaeological trace of the rebuild. Stone-built houses are traditionally considered to be more enduring than timber structures because they are less susceptible to decay (cf. Jobey & Jobey 1987, 168). However, experiments by Peter Reynolds revealed that the lifespan of a stone-walled structure is to a large part still determined by the lifespan of timber. Experiments during the construction of the *Conderton House* to replicate wall collapse in the archaeological remains revealed that collapse had occurred after decay of the wooden wall-plate (Reynolds

forthcoming). As such the low number of rebuilt stone structures may reveal the short duration of their occupation coupled with a tendency not to reoccupy the site. Of the low number of rebuilt structures, a high proportion - one in two - were subjected to repeated rebuilding: a much higher level than in timber structures. This might suggest that those hut-circles which *are* rebuilt are far more likely to be returned to time after time. Such a scenario might indicate their use as seasonal structures.

The majority of rebuilt structures (78%) were rebuilt only once (table 7.1). Twenty-six structures (from 18 sites), however, were rebuilt more than once. No turfines were recorded at these sites and it is often assumed that the sequences reveal settlement longevity. Another possibility is that repeated rebuilding is evidence for refurbishment after episodes of abandonment. In this scenario we might see structures with multiple rebuilds as seasonal structures – perhaps linked with livestock management – which undergo winter abandonment. Equally, such structures may see refurbishment after longer periods of abandonment in a highly mobile settlement system: Murton High Crag CS S2, for example, was apparently rebuilt after a lapse of settlement (Jobey & Jobey 1987). To test the hypothesis that repeated rebuilding was evidence for seasonal or episodic abandonment in mobile communities, the number of rebuilds were plotted against height above sea level and settlement location. Sites with more than one structure were counted only once to avoid bias. No distinction between sites below and those above 200 m above sea level was found (fig. 7.3).

Site	CS	Region	Period	No. of Rebuilds	Reference
Cùl a'Bhaile	-	Highland	MBA	3	Stevenson 1984
Broxmouth	B	North Sea	LBA-EIA	3	Hill 1982b
Woodend Farm	-	Irish Sea	EIA	6	Banks 1995
Scotstarvit	-	Highland	IA	3	Bersu 1947-48a
St. Fergus to Peterhead	1	Highland	IA	4	Strachan 1998
Breiddin	R1	N. Wales	EIA-LrIA	5	Musson <i>et al.</i> 1991
Breiddin	R2	N. Wales	EIA-LrIA	2	Musson <i>et al.</i> 1991
Ballanorris	-	Irish Sea	LrIA	3	Bersu 1977
Collfryn	2-3	N. Wales	LrIA	2	Britnell <i>et al.</i> 1989
Collfryn	4B	N. Wales	LrIA	2	Britnell <i>et al.</i> 1989
Collfryn	5A	N. Wales	LrIA	4	Britnell <i>et al.</i> 1989
Collfryn	8	N. Wales	LrIA	3	Britnell <i>et al.</i> 1989
Crawcwellt West	J5	N. Wales	LrIA	3	Crew 1998
Crawcwellt West	A	N. Wales	LrIA	4	Crew 1989a
Dalladies	7	Highland	LrIA	4	Watkins 1978-80a
Thorpe Thewles	E	North Sea	LrIA	3	Heslop 1987
Belling Law	1-4	North Sea	LrIA-RIA	3	Jobey 1977
Broxmouth	4	North Sea	LrIA-RIA	4	Hill 1982c
Hartburn	21-23	North Sea	LrIA-RIA	3	Jobey 1973a
Hartburn	29-30	North Sea	LrIA-RIA	2	Jobey 1973a
Kennel Hall Knowe	B	North Sea	LrIA-RIA	3	Jobey 1978
Tower Knowe	A	North Sea	LrIA-RIA	4	Jobey 1973b
Boonies	9-11	Irish Sea	RIA	2	Jobey 1972-74
Boonies	3-7	Irish Sea	RIA	4	Jobey 1972-74
Burnswark Hill	1-3	Irish Sea	RIA	3	Jobey 1977-78
Newmill	-	Highland	RIA	2	Watkins 1978-80b

Table 7.1 Circular structures with multiple rebuilds

With regard to settlement location however (fig. 7.4), it was found that structures with only one rebuild were more likely to have a slope location; those with three or more rebuilds were more likely to be located in the valley. The majority of rebuilt structures – those with one rebuild – might, therefore, reveal the longevity of a year-round residence; whilst one in four – those with three or more rebuilds – might reveal evidence for seasonality. Those structures located on summits revealed both single and multiple rebuilds with slightly more structures revealing just one rebuild. This might indicate that whilst some upland sites were continually (seasonally) reoccupied, most were subjected to longer-term abandonment prior to reoccupation. Figs 7.5-7.6 show the complete picture and confirm that only valley structures were consistently treated differently. The current understanding then is that rebuilding activity is sounder evidence for longevity than is evidence repair but that multiple rebuilds, like repair, are more likely to indicate seasonal use or episodic abandonment.

Using ethnography, Brück suggests that construction takes place on the formation of a new household i.e. on 'marriage' (1999b, 149). Similarly, Catherine Cameron (1991) suggests that rebuilding takes place when population, and hence resources are high. At household level this may be when the household is home to adult children. It was decided to test these hypotheses by discovering whether structures generally increase or decrease in size on rebuilding. Only structures rebuilt once were used as these are more likely – than those with multiple rebuilds – to represent the main residence. Nineteen reliable sequences could be established and the change in area between each phase recorded. It was found that the same proportion of households (42%) rebuild a smaller structure as do the proportion constructing a larger structure.

This implies that a prehistoric household can be rebuilt either following household decline - i.e. when adult children move out – or during household growth. As such, households might be *established* either when the group has realised its maximum potential i.e. when with a young family; or prior to the birth of the family, having to expand as the family grows. Only one in six rebuilt structures revealed continuing stability within the household. The assumption is that increase in structure size reflects demographic change. Another possibility is that in pastoralist communities, an increase/decrease in structure size reflects changes in stock numbers: agricultural expansion or decline. It can be assumed, however, that the factors of demography and economy are generally linked.

The idea, raised earlier regarding repair, that certain types of structure may have different *expected* lifespans is raised again regarding rebuilding at the site of Collfryn (Powys). Here, the excavator noted that the smaller structures, those with narrower doors, were rebuilt less often and were perhaps therefore less permanent. These structures were all sited towards the rear of

the enclosure (Britnell *et al.* 1989, 113). This raises the possibility that the function of a structure had an impact on its prescribed lifespan. As such, the function of a structure and its expected lifespan may have *determined* which materials were used to construct it and whether it was repaired or rebuilt upon decay; or simply abandoned.

There are many examples of timber structures being rebuilt in stone, for instance in the RIA at Tower Knowe and at Belling Law in Northumberland (Jobey 1973b; 1977). Elsewhere, for example at Lairg in Highland Scotland (McCullagh & Tipping 1998, 57) and Ormiston Farm in Fife (Sherriff 1988, 102) rebuilding timber structures in stone seems to have occurred during the LrIA. At the same time, timber structures such as Moel y Gerddi and at Castell Odo in Gwynedd were being consolidated with stone rather than being repaired with timber. At Thorpe Thewles, a change from timber to mass-walling may also have been a feature of the later IA. The excavator suggested that the use of bulk walling made up for a decline in locally available timber (Heslop 1987, 118).

7.2.3 Re-use Deposits

Re-use deposits are essentially a foundation deposit provided for a structure which has been rebuilt. Such deposits are rare in northern prehistory with only nine structures (just 5% of rebuilt structures) from five sites displaying evidence for such activities. Most of these activities involved the deposition of an inverted quernstone prior to reconstruction of the house. At EIA-LrIA Breiddin R5 (Powys): a cracked saddle-quern and another stone had been set alongside one another overlapping the top of the Phase 1 wall-slot cut. The saddle-quern had been inverted over its own rubbing stone and both were within the make-up material for the Phase 2 floor. The excavator argues that they may have been a 'sill' for a secondary entrance (belonging to either phase); or the base for some kind of internal fitting against the wall of the second structure. Alternatively they could be evidence for a re-use deposit (Musson *et al.* 1991, 46; Microfiche 2, 99). At RIA Crossgates (North Yorkshire), on the apparent enlargement of CS 4, the paved floor was re-laid and a sandstone 'bowl-like object' was inverted and sealed beneath the centre of the structure in a deposit of burnt soil (Rutter & Duke 1958, 19).

Similarly, quern deposition has been noted during re-flooring episodes. At E-MBA Lairg (Highland) in both CS 3 and CS 4, the rubble and soil infill of the wear-gullies included a large inverted saddle quern to the rear of the building, opposite the entrance (McCullagh & Tipping 1998, 42-49). At EIA Douglasmuir the structures produced more than thirty querns; in CS 6 five were inverted as part of the sparse paving in base of the ring-ditch scoops (Kendrick 1995, 49). The site also produced a number of small hollowed stones and a cup stone from the same contexts. A high number of querns were also found in the ring-ditch houses of LBA-EIA

Dryburn Bridge and Broxmouth along with their rubbers, although the details of deposition are, as yet, unclear. Inverted saddle querns have also been discovered at the recently excavated ring-ditch houses of Kintore (M. Cook pers. comm.)²⁴.

It is clear, however, that other traditions also exist at some sites. At LrIA-RIA Broxmouth CS 4, phases 2 and 3 of the hut-circle wall contained a single skull of the short-horned Celtic ox in their basal layer. In the sweepings beneath the Ph.3 wall were a human lower jaw, three antler gaming pieces, a broken antler comb and a few crude bone artefacts. These deposits were described by Peter Hill as 'ritual dedication deposits' (Hill 1982b, 31). Finds from the northern house included an intact goat skull (*ibid*, 34). At Lairg CS 3, a large sherd (weighing 250g), was found amongst the turf make-up of the wall and as it is improbable that it could have been included unwittingly with the cut turves, deliberate deposition must be assumed" (McCullagh & Tipping 1998, 45).

Are reuse deposits to be seen as the same as foundation deposits in that they too are deposited prior to the use of a new structure? However, as rebuilding is often linked to changes in household size is it possible that the deposited quernstone – if seen as a personal possession – might have more to tell about the social activities involved in house rebuilding? Since the majority of structures are rebuilt during household decline and this may be linked to the departure of adult children, we can envisage a scenario as follows. The quern belonging to the adult child is no longer required for the parental household; querns are seen as site furniture and a new quern will be provided for the new household. Might we see the deposition of the quern during the rebuilding of the parental home as symbolising the end of a phase in the household's history: from a young household to an ageing household? Marking the transition from a period of growth to a period of decline?

7.3 Structure Lifespans

By ascertaining likely minimum and maximum limits of the average lifespan of a circular structure, we can begin to build models of prehistoric social behaviour. How did prehistoric people live in their landscape? Was settlement sedentary or transient? Were there such things as seasonal structures? This section begins by reviewing previous lifespan estimates and highlighting the debate currently taking place in Scottish prehistory. It then goes on to look at the evidence for wood and thatch decay and the lessons that have so far been learnt from experimental constructions. The third section assesses the archaeological evidence for the length of structure occupation. The topics of structural repair, wear erosion and non-structural maintenance are discussed in an attempt to find out what these factors can contribute to an

²⁴ For a discussion of quern and cup-marked stone deposition in other contexts see Hingley (1992).

understanding of structure lifespans. It is recognised that cultural factors also determine structure lifespans. However rather than give a number of ethnographic examples to illustrate the potential *variety* of cultural behaviour, this is taken as a given. The aim of this section is to ascertain the maximum *structural* lifespan and review any archaeological evidence for use-life.

7.3.1 Previous Estimates

In discussing his Manx houses – excavated between 1941 and 1944 - Bersu estimated that each structural phase lasted for fifty years. He arrived at this figure using what he knew to be the natural lifespan of an oak post: thirty years. He increased this to fifty years because of the evidence for structural repair (Bersu 1977, 24). For the occupation at Scotstarvit Covert - which consisted of two structural phases – he therefore suggested a duration of *c.* 100 years (Bersu 1947-48a, 257). At Llwyn-du Bach, despite evidence for repair, Bersu suggests that each of the *stone-built* structures had a lifespan of thirty years: here *three* phases were given a maximum occupation of 100 years (Bersu & Griffiths 1948-49, 201). At West Brandon, Jobey uses Bersu's upper estimate and gives the two structural phases, each having been repaired, a combined lifespan of *c.* 100 years (Jobey 1962, 28).

At Fisherwick, Miles (1968-69, 11) uses Bersu's lower estimate of 30 years and in 1969, A.H.A. Hogg suggested that the lifespan of an oak post was, in fact even less: between ten to thirty years (Hogg 1969, 155). Despite Hogg's assertion, however, the fifty-year estimate was again used, this time by Stanford (1971) for hillfort structures in the Welsh borders. At LrIA Hartburn (Northumberland), the pottery evidence suggested occupation for seven or eight centuries corresponding with a minimum of twelve replacement phases; as a result Jobey concluded that Stanford's (1971) fifty-year figure, although 'ambitious' for the Hartburn structures, might be supported (Jobey 1973, 47). Bersu's 30-50 years estimate had by this time been accepted for at least a quarter of a century. This changed, however, in the late 1970s when, prompted by his work at Butser Iron Age Farm, Peter Reynolds suggested that there was no reason why an Iron Age roundhouse should have a lifespan any less than that of a medieval timber-framed building i.e. several centuries (Reynolds 1977, 38).

The main problem with Reynold's assertion is that in prehistoric circular structures, the *vertical* position of the post in the ground allows the major natural route for water absorption to continue functioning. Medieval timber-framed buildings, on the other hand, are based on the sill-beam; because of the *horizontal* position of the timber in the ground, this significantly reduces grain end water absorption (Rideout 2000, 130). This limits structural decay and thus the life expectancy of a medieval timber-framed building is greater than that of the prehistoric roundhouse. Nevertheless, Reynold's assertion was reiterated by Inman *et al.* (1985), apparently

supported by excavations on Dartmoor where C-14 dates from stone-walled structures had spanned a 500 year period (Inman *et al.* 1985, 209-210). Following this, Kelly (1988) suggested that the Erw-wen (Gwynedd) structure, with its three main structural phases (two timber, one of stone) had lasted for 200-300 years. By the late 1980s, Bersu's original 30 year estimate per structural phase had been extended to somewhere in the region of 100 years.

The apparent longevity of prehistoric settlement has recently been brought into question (Barber & Crone forthcoming; Halliday forthcoming; Cowley forthcoming). It can be argued that a modern 'efficiency mentality' exists as an underlying assumption in much work: that the expenditure of effort must imply the desire for longevity (*ibid*): "the sheer investment of labour and material in constructing such a building argues that its life span should certainly exceed one generation" (Reynolds 1994, 24). Seventy years ago, archaeologists in southern England were convinced that prehistoric people lived in pits; that prehistoric dwelling was primitive (cf. Kuper 1988). In accepting Bersu's roundhouse at Little Woodbury, archaeologists also had to accept that late prehistory was *not* primitive. Perceptions shifted and Iron Age people, no longer the uncivilised 'other', took on many of the qualities of a more civilised pre-'us' (cf. Hill 1989), including perhaps the longevity of settlement. Roundhouse studies has never quite reconciled the idea that prehistoric people constructed sizeable, sound structures as a matter of course (Cowley forthcoming).

In assuming longevity, a circular argument follows whereby evidence for repair is seen to confirm the original assumption. This is apparently supported by long pottery sequences, for example, at Hcslerton CS 6, where a lengthy occupation was apparently supported by the 200 years worth of ceramics from the immediate area of the structure (Powlesland 1986, 137). Second, the assumption appears to be supported by evidence from C-14 dating, for example at Rock Castle (North Yorkshire): "the radiocarbon dates indicate a prolonged occupation, beginning in the early Iron Age and persisting until the Roman conquest" (Fitts *et al.* 1994, 13). What has recently come to the fore, however, is that the range of an artefact assemblage or of a sequence of C-14 dates - may not actually be sound evidence for assuming continuous occupation (Barber & Crone forthcoming; Halliday forthcoming). It may instead be evidence for a *longevity of place*, with a certain location being abandoned and re-occupied as part of a complex settlement system (Halliday forthcoming). The idea has been around from an early stage, having been given a brief mention by Bersu (1948-49) at Llwyn-du Bach (Gwynedd). The question of non-continuous occupation was also discussed briefly by Jobey (1973a) in his consideration of Hartburn (Northumberland):

"the problem of deciding between long and long though not necessarily continuous occupation It could be argued that short spells of occupation at intervals would give the same interior structural complexity"

(Jobey 1973a, 47)

A lack of direct evidence had inhibited further research on this topic until fairly recently, when advances in dendrochronological research provided the first reliable evidence for settlement duration (cf. Coles & Coles 1995). Suitable evidence has been retrieved from a number of early prehistoric wetland sites in Europe (*ibid*), and also from the early historic period at Buiston Crannog (Crone 2000) and Deer Park Farms in Co. Antrim (Barber & Crone forthcoming). Using this as a starting point, new estimates for structure lifespan range from between 5-10 years - for unenclosed hut-circles in northern Scotland (Halliday forthcoming) - to around 20 years (Barber & Crone forthcoming). These estimates, however, are heavily reliant on evidence from wetland environments and, as such, may not be directly applied to *dryland* data. Timber which sees persistent wetting and drying action is particularly susceptible to both soft rots and attack from specialist insects such as the wharf borer (Coggins 1980, 84). It is predicted that the rate of structural decay – a major factor in the consideration of lifespans - would be significantly slower in dryland environments than it has been found to be in wetland environments.

7.3.2 Decay Experiments

The most influential, non-cultural factor affecting a structure's use-life is that of structural decay. The decay of wood can be attributed to two main factors: fungi and insects. Erosion, as a result of light, wind, or water movement, is slight and amounts to only 1-7 mm per century (Rideout 2000, 32). The key to decay is the moisture content of the wood, 90% of which is held in the sapwood (Coggins 1980, 17). As felled trees begin to dry out, the wood's natural resistance to decay declines as the water it holds is slowly replaced by oxygen. Wood is only immune from decay if it is kept dry or is submerged in water (Rideout 2000, 23; Cartwright & Findlay 1958). Both fungi and insects use the damp timber as a food source: the former absorbing nutrients from the damp surface, resulting in rot; the latter ingesting the wood fibres, resulting in physical decay (fig. 7.7) (Rideout 2000, 27).

The average growth of dry rot is 1 m per year. It can, however, be lived with. In 1972, Rentokil estimated that no less than 17% of British houses were suffering from dry-rot decay; and an even greater proportion: 36% from wet-rots (Coggins 1980, 78) The effects of decay are not immediate. However when advanced, decay not only presents structural problems it also causes the deterioration of the living environment. It is thought that the millions of airborne spores which are produced by decay fungi can aggravate allergy-based conditions, such as hayfever (*ibid*, 42). Similarly the spores of moulds could present a health hazard to humans (Rideout

2000, 83; 90) and allergies may also be caused by the large numbers of mites that breed in damp, mouldy wood (Coggins 1980, 67). Table 7.2 is based on research by the 1987 Technical Committee of the European Committee for Standardisation. It reveals under what conditions wood becomes susceptible to decay and also the various forms that decay takes.

Class	Wood Conditions	Moisture Content	Decay Type
1	Above ground; covered	<18%	Insect attack
2	Above ground; covered; risk of wetting	Occasionally >18%	Insect attack predominates; brown rots if high moisture content is sustained
3	Above ground; uncovered	Occasionally >20%	Insect attack; stain fungi; white & brown rots
4	In ground or fresh water	>20%	Soft rots; other fungi at air/soil interface
5	Salt water	>20%	Specialist fungi & marine invertebrates

Table 7.2 Conditions conducive to the reproduction of wood decay organisms
(Source: Rideout 2000)

In table 7.2, the conditions most relevant to prehistoric architecture are those of Classes 3 and 4. The conditions described by Class 3 would be consistent with decay towards the bottom of an undaubed wall for example. Those described by Class 4 would be consistent with post-end decay. Evidence for the effects of soft rot, for example, were found at the base of some palisade timbers at Huckhoe in Northumberland (Jobey 1968, 294). Dry timber which is intermittently wetted – i.e. higher up the post – will also eventually be destroyed by *soft rot* (Rideout 2000, 29). The type of rot most likely to affect prehistoric circular structures would be *white rots* which are predominantly associated with hardwoods and wetter conditions than *brown rots* which tend to favour coniferous softwoods (*ibid*, 29-30). The most common white rots, *oak rot* and *cellar rot*, are both wet rots (*ibid*, 92; 96).

Experimental Archaeology

Peter Reynolds conducted the first archaeological research on wood decay via experiments at his *Pimperne House*. The reconstructed circular structure consisted of a stake-built, wattle-and-daub outer wall with a supporting post-ring of twenty-seven 0.30 m diameter oak roof supports set in packed postholes. The posts were probed on an annual basis to test for decay and when the structure was dismantled, after having stood for fifteen years, the whole process was recorded (Reynolds 1993; 1995). The bases of the six main rafters, which had been anchored into the ground, had rotted away steadily over eight years (Reynolds 1988, 24). During the same time the porch posts (unseasoned oak and 0.35 m in diameter) had rotted at ground level until a gale induced a degree of collapse (Reynolds 1993, 101): revealing the effects of both white rots and soft rot. It was estimated that the replacement posts would have had a slightly longer lifespan to that of their predecessors – suggesting an average of *c.* 10 years (Reynolds 1995, 22). Fig 7.9 - inspired by Reynold's work - reveals how decay develops in a double-ring structure.

At the *Pimperne House*, the outer sapwood of the central-ring posts had rotted away after eight years (Reynolds 1993). Left behind was a stump of heartwood surrounded by a doughnut-like cavity filled with air and wood debris. Likewise, at the *Thirlings House* at Bede's World in Jarrow (Tyne & Wear), the sapwood of the 0.30 m squared oak roof-supports was found to have rotted away after *c.* 7 years whilst the heartwood remained unaffected (Val Waltyl pers. comm.) and fig 7.8 shows developed post-end decay in the *New Bewick Grubenhaus*. Despite this, both constructions remained structurally sound as the heartwood alone was more than capable of providing support for the vertical thrust of the roof (Reynolds 1993, 109-110). Heartwood is more resistant to decay because its dense structure limits the amount of oxygen that can be held, resulting in low porosity (Cartwright & Findlay 1958, 266); this discourages decay fungi, which need a porous structure in order to absorb the wood's nutrients. At Castell Henllys, the central-ring post butts of the 1982 roundhouse had rotted away after just ten years (Bennett 2001). Suspended from the ring-beam, they did not compromise stability as they were found to have no structural role by that time (*ibid*).

Sapwood decay may be seen in evidence provided by the survival of post-pipes. This evidence suggests that the post – at the very least the post end – rotted *in situ*. Almost without exception the diameter of the post-pipe is always significantly smaller than that of the posthole cut. It is often assumed that this reveals over-compensation on the digging of the posthole with the post being packed round with soil on post erection. It is suggested, however, that there is a desire to limit space around the post on erection – unless it is to be stone-packed – as it is in this way that greater stability is achieved. As such, the soil surrounding the post-pipe can alternatively be seen as material that has worked its way into a decay cavity (Barker 1982, 87) and the post-pipe is the soil from the archaeological decay of the surviving heartwood (fig. 7.10). The degree of difference between posthole and post-pipe width tends to be greatest in those features more exposed to the elements. This might be taken to suggest that decay was more advanced in these cases, as might be expected from fig. 7.11. The fact that post-pipe width stays fairly constant, however, tends to contradict this. Rather than indicating that larger posts were used in the entrance features, as is the common interpretation, the increased posthole size reveals that these features are more frequently repaired (cf. Reynolds 1993).

Whilst sapwood decay does not compromise post strength, if decay advances into the heartwood, the post does become weakened, especially at ground level (fig. 7.9). On dismantling, *lateral* thrust was introduced to eighteen of the *Pimperne* posts and eight of them broke at ground level. For these posts, rotting had advanced into the heartwood and the wood itself was damp (Reynolds 1993, 110). According to Reynolds' 1995 account, the butts of five of these posts had rotted away entirely (1995, 23). The above-ground post remained supported,

however, as a shift in the uppermost packing stones – presumably occurring as decay gradually progressed at ground level – had produced a supportive overhang (*ibid*). The work of Bennett (2001) suggests post-end decay in the central-ring is of no consequence as the feature is only structurally necessary during construction. The majority of the decayed Pimperne posts were in the quadrant that had sustained gale damage in 1986 and where water had been running down the posts prior to re-thatching (Reynolds 1993, 110). Taking this into consideration, Reynolds predicts a lifespan for posts of *c.* 20 years (Reynolds 1995, 23). This however was based on use of unseasoned timber.

Reynolds stresses that because of: a) the binding support/strength of a completed cone and cylinder structure; and b) the lack of lateral stresses strong enough to disturb that stability, even decay of heartwood does not compromise structural integrity (1995, 23). He points out that post decay would not only be known about but also monitored and remedied by the prehistoric homeowner. Such a response is in evidence amongst the Dorze tribe of western Ethiopia. Their *chencha* house takes the form of a high (rarely lower than 6 m) dome. The building of such a structure is a direct response to the effects of Class 4 decay. When the base of the wall begins to rot the house is simply lowered by removing the affected portion. This allows a new, unaffected section of the wall to come into contact with the soil; thus extending the lifespan of the structure (Gebremedhin 1971, 117). But a dome structure is more self-supporting than a cone-and-cylinder type and an engineers report at Castell Henllys stated that the lateral thrust of the conical roof would eventually cause the decaying walls to splay (Bennett forthcoming). Bennett suggests however, that the ring-beam and wall-plate would prevent this (*ibid*).

Reynolds suggests that post-end decay may not effect a structures lifespan as the introduction of an artificial fill into the decay cavity would help to maintain support. Developing this, he goes on to suggest that, as decay progresses, the posthole itself becomes effectively obsolete as the vertical thrust of the structure is supported by the introduced fill (Reynolds 1993, 111; 1995, 23-24). Evidence for this is rare in the archaeological record – mostly because a uniform fill without a post-pipe is generally assumed to be evidence for the salvage of structural timber. If Reynolds' idea is correct it would suggest that the lifespan of a circular structure would be in excess of the figure dictated by wood decay. Unfortunately, even had post-end decay been combated in the way described by Reynolds, it remains that decay continues to advance in already vulnerable wood (Cartwright & Findlay 1958, 250). As such, the suggestion that post-end decay does not affect structure lifespans is rejected. Bennett suggests that structure lifespan is determined more by decay in the rafters, wall-plate and wall-posts above ground level (Bennett forthcoming). The current author suggests that it is the last of these which may be the determining factor. Reynolds' second assertion - that structural integrity is not *immediately* threatened by post-end decay – is, however, accepted.

The lifespan of an unprotected wattle hurdle is between 3-7 years (Reynolds 1993, 103). With ongoing repair to cracks, the daubed stake-wall of the *Pimperne House* managed to survive for ten years before it was finally redaubed (*ibid*). The wall had survived remarkably well, as the clay element to the daub provided a damp-proofing effect and it had been protected to some extent from the rain by the eaves. The wall remained durable even at the back door - where leaking *had* managed to cause advanced decay in a roof-support post. On dismantling, the wattle element of the wall was found to be dry, strong and not brittle (*ibid* 103; 111). A degree of rotting had taken place at the base of the stakes to a height of 0.15 m (the sharpened area). Again, this was not considered by Reynolds to be terribly important regarding structure lifespan. Even if the base of the stake had rotted completely; the remainder was held in tension by the vertical rods. This, combined with the fact that the hardened daub sealed both elements, meant that the wall had become a completely stable element which would continue to operate effectively despite stake end decay (*ibid*, 112).

As well as rot, insects can also be a factor working against post survival. The weevil family alone has 60,000 different species – most of which attack timber (Rideout 2000, 25). Insects will continue to destroy timber long after conditions have become too dry for fungus development (*ibid*, 99). The outer sapwood is particularly vulnerable and can attract insect attack even in dry conditions (*ibid*, 131; Cartwright & Findlay 1958, 276). Decayed hardwoods, in particular oak and willow, are the natural habitat for death-watch beetle. The furniture beetle (*anobium punctatum*) – which is often associated with dry-rot decay (Coggins 1980, 81) - was found among the insects from the enclosure ditch at the E-MIA site of Fisherwick 3 in Staffordshire (Smith 1979, 30). Reynolds (1993) makes no mention of insect attack at the *Pimperne House* and although worm infestation did take place, it was found to have only penetrated 2 mm into the wood (Reynolds 1993, 107-108). Had insects been present alongside rot fungi, the rate of decay would have increased (Coggins 1980, 79). It is often the case, however, that insects do not inhabit wood until a fungus has already taken hold (Rideout 2000).

Despite decay, the *Pimperne House* remained structurally sound after fifteen years and in 1994, Reynolds gave a minimum estimate of c. 25 years lifespan. The two main areas of weakness can be partly attributed to design flaws. The first, the failure of porch posts after eight years may have been accelerated by the provision of only very shallow eaves over the doorway, leading to inadequate protection from the rain. This was corrected with the introduction of deeper porch eaves at Reynolds' later *Longbridge Deverill Cow Down House*. The second weakness, the advancement of decay into the heartwood of the north-west central-ring posts can be put down to the failure of the thatched roof. Apparently thatched to just one third of the established thickness, it had been damaged in a gale, leading to a major leak with water running down the

central posts (Reynolds 1993). Once wood has begun to decay its further progress becomes progressively more rapid, as the area effected remains damp for proportionately longer periods than if it were sound (Cartwright & Findlay 1958, 250). Secondly, the 45° pitch was too slight to see effective run-off (see 5.3.2). Main (1998) estimated that total reconstruction of the *Pimperne House* would have become inevitable at 20-25 years after construction (Main 1998, 302).

A thatched roof can be expected to last for anything between 10-60 years (table 7.3). The *Pimperne House* roof, with 0.10 m of wheat thatch, lasted ten years despite repeated patching (Reynolds 1993). An estimate of 15 years was given for the second roof (Reynolds 1995, 22). At Bede's World in Jarrow (Tyne & Wear), the experimental Anglo-Saxon constructions sustained storm damage to their roofs after 100 mph winds (fig. 7.12). Here again, the thatch was only *c.* 0.20 m thick. On dismantling, the constituent parts of the *Pimperne House* roof frame were found to be in sound condition (Reynolds 1993, 108), so too were the ties (Reynolds 1994, 22). The joints between the rafters and the vertical posts had become so 'rigidly fixed' that they had to be cut away (*ibid.*, 109). This is presumably as a result of the wood's swelling because of its close proximity to the often-wet roof. Preventative measures against thatch decay have been recorded amongst the Sidamo of western Ethiopia and the baKosi of western Cameroon. The smoke from the open fire – especially when cow dung fuel is used – coats the thatch with soot, sealing and drying the exposed surfaces, thereby slowing the rate of decay. During the rainy season a fire is kept permanently lit to help preserve the life of the roof (Gebremedhin 1971, 118; Levin 1971, 148). In the *Pimperne House*, smoke blackening was restricted to the upper third of the roof, from the ring-beam to the apex (Reynolds 1993, 109).

	Water Reed	Combed Wheat Reed	Long Straw	Ling
Lifespan	40-60 yrs	25-40 yrs	10-20 yrs	20-50 yrs

Table 7.3 Average lifespans of thatch

(Sources: Rural Industries Bureau 1961; Coggins & Fairless 1984; Reynolds forthcoming, 225)

Wood Microbiology

In strength tests it was found that *brown rots* can cause substantially greater strength losses at lower weight losses than can *white rots* (table 7.4). A brown rot can reduce the strength qualities of wood by as much as 75% before weight loss has even reached 5% (Zabel & Morrell 1992, 261). *White rots*, however, result in less strength loss. It has already been established that the rot most likely to effect prehistoric structures would be white, wet rots and softs rots, so it can be suggested that the effect of rot on strength loss was minimal. Forestry Commission experiments (table 7.5) indicated that heartwood/sapwood stakes 0.08 x 0.10 m in diameter failed lateral strength tests within 9-17 years after erection. 50% had failed after just 3-4 years. A figure

confirmed by Reynolds (1988) regarding the unprotected timber framework of the second *Moel y Gaer House*. These tests are not useful regarding structure lifespans (contra Main 1998). In the Forestry Commission tests, the stakes were subjected to lateral stresses rather than the vertical stress that a post in a circular structure endures. They were also completely unprotected from the elements. The posts in a circular structure are protected by the roof and/or the daubed walls and the hearth provides the opportunity for wet posts to dry out.

	Weight Loss (max)	Strength Loss (max)
White Rot	97%	Lesser
Brown Rot	70%	Greater
Soft Rot	3-60%	Unknown

Table 7.4 Weight and strength loss according to rot type
(Source: Zabel & Morrell 1992)

	25%	50%	75%	100%
Ash	2 yrs	3 yrs	5 yrs	9 yrs
Birch	2 yrs	4 yrs	6 yrs	c. 17 yrs
Oak	3 yrs	4 yrs	5 yrs	9 yrs
Pine	2 yrs	3 yrs	7 yrs	c. 17 yrs

Table 7.5 Percentage failure of stakes and strength lifespan
(Source: Clarke & Boswell 1976)

A number of factors influence the rate of post decay in circular structures, including the type of wood, the diameter of the post, whether it has been seasoned, the soil type and conditions, as well as the position of the post within the structure. For example, decay is more rapid in light, porous, humic soils than in heavy clay or peaty soils because the latter suffers from waterlogging/lack of oxygen (table 7.6). Posts also decay more in chalky soils than in gravels (Cartwright & Findlay 1958, 250). An estimate of 15-25 years has been given for the survival of posts in chalk (Drewett 1982, 343). In controlled tests by the Princes Risborough Laboratory – and contrary to popular belief – charring was found to make no difference to post lifespan (Clarke & Boswell 1976, 21). Nowadays, fencers use a product called Agrico Urea. Urea is a soluble nitrogenous compound excreted in urine and is considered to be effective against *Fomes Annosus* or butt rot (Charterhouse Richmond 2000, 59). At West Brandon (Co. Durham), the double postholes reveal the replacement of posts on the west/weather side (Jobey 1962, 13). Similarly, Reynolds noted that most damage to the *Pimperne House* was sustained in the north-west quadrant as this was the direction from which the worst weather arrived (Reynolds 1993, 103).

	5 years	10 years	15 years
Clay	50%	85%	100%
Loam	70%	100%	-
Peat	20%	65%	85%

Table 7.6 The comparative failure of hardwood stakes according to soil type

(Source: Clarke & Boswell 1976)

The decisions surrounding the choice of wood and the treatment of timber would also have a marked effect on structure lifespan. It has already been established that the main wood type chosen for house construction was oak (see 5.2.1). Experiments in 1953 discovered no difference in the resistance to decay of slow and fast-grown oak (Cartwright & Findlay 1958, 267). More recently it has been suggested that juvenile timber might have a lower resistance than mature heartwood because of the higher proportion of sapwood in the former (Rideout 2000, 24; Cartwright & Findlay 1958, 253). The 'squaring off' of a timber can help to combat this. This process rids a timber of the majority of the wood's vulnerable sapwood, so creating a more durable heartwood post. Seasoning - the drying out of timber prior to use - helps to minimise decay and stabilise distortion in felled timber. If timbers are carefully piled, the moisture content can be reduced to as low as 17% which is low enough to discourage decay organisms (Ridout 2000, 119; 121). Oak is known to dry very slowly – taking up to two years – and also has a marked tendency to split (Coles & Coles 1995, 28; Desch & Dinwoodie 1981, 206).

Decay experiments at the Princes Risborough Laboratory of the Building Research Establishment looked at the decay rates of 0.05 m diameter heartwood stakes (table 7.7). Oak was found to have a lifespan of *c.* 20 years. Recent work in the Netherlands estimated that 0.15 m diameter oak posts would decay after 60 years; and alder after 16 –24 years (Gerritsen 2001, 35). This might confirm Barker's (1982) suggestion that decay rates – at least for oak - are directly proportionate to post size (Barker 1982, 89). On this basis, a 0.30 m diameter oak post - the average width of a prehistoric posthole - might have a potential lifespan of 120 years. Further experiments on untreated 0.10 x 0.05 m diameter posts reveal that 25% fail after 20 years (table 7.8). Taking these results into consideration, Barker (1982) suggests that if, after 20 years, 25% of a building's uprights have decayed then repair might become necessary (Barker 1982, 91).

Perishable (<5 years)	Non-durable (5-10 years)	Durable (15-25 years)
Alder, Ash, Birch, Poplar (black), Willow	Elm, Poplar (grey), Scots Pine	Oak

Table 7.7 Durability of British archaeological wood types
(Source: Barker 1982; Dinwoodie 1981)

	18 years	20 years	34 years	36 years
Oak	15%	25%	45%	60%
Scots Pine	80%	95%	100%	-

Table 7.8 Percentage failure of 0.10 x 0.05 m diameter posts
(Source: Barker 1982)

After 15 years, five (18%) of the roof-support posts of the *Pimperne House* were in a state of advanced decay, with the complete loss of the post-end (Reynolds 1994, 23). A further three (11%) failed lateral strength tests. However, the house was still structurally sound and not obviously in need of major repair. As a result, Barker's (1982) assertion – 25% post failure warrants repair – can be replaced by a new hypothesis: structural integrity is impaired when 35% of a building's uprights are in a state of advanced decay. If, as argued by Barker (1982, 89), the rate of decay is proportionate to the narrowest dimension of the post; the Princes Risborough data (table 7.8) may point to 35% failure in 0.30 m diameter posts after *c.* 95 years. This agrees with Wainwright's assertion that oak heartwood posts survive 15 years for every 5 cm of diameter (Wainwright & Longworth 1971, 224-225). According to *Pimperne's* decay rate, however, 35% failure would have been achieved after 29 years. It must be remembered that the *Pimperne* posts may have been exposed to accelerated decay due to unrepaired storm damage and their green state during construction (Reynolds 1993). More importantly, the *Pimperne House* was not permanently occupied and presumably suffered decay acceleration as a result of the effects of abandonment episodes, particularly in the winter months.

Bersu (1947-48a) stated that if structures were left unoccupied in the summer months, they would need more repairs than would constantly inhabited ones. In fact the negative effects of a *summer* abandonment are negligible because of the improved climate. Dry rot stops growing at *c.* 26°C – a temperature often reached in exposed timber on a warm summer's day - and wet rot can be stopped (temporarily) by drying alone (Coggins 1980, 37; 107). Decay would actually be more prevalent in structures abandoned during the winter months - so long as the temperature remains above freezing (Coggins 1980) – due to increased rainfall and persistent damp conditions in the unheated structure. Important to this, as stated above, is the fact that once wood has begun to decay its further progress becomes progressively more rapid as the area effected remains damp for proportionately longer periods than if it were sound (Cartwright & Findlay 1958, 250). The *Pimperne House* was effectively abandoned during the winter months which will have acted to accelerate the rate of decay. As a result the *Pimperne* data may provide too low a figure for structural decay.

With this in mind we must return to the Princes Risborough data which, after Barker (1982), implies that structural decay occurs more than three times slower than suggested by the *Pimperne House* experiment. Is this figure too high, however, in light of the *Pimperne* experiment? Is it actually correct that decay rate is directly proportionate to post size? Only further work that combines an archaeological agenda with new experiments in wood microbiology can clarify the matter further. What must also be borne in mind is the argument made by Reynolds (1995) for continued structural integrity despite decay. For the sake of ease,

a figure between the two is accepted – erring slightly on the side of the *Pimperne* experiment – and the maximum structural lifespan of a circular structure is taken as sixty years. It is further suggested that the *Pimperne House* experiment reveals the ability of even a seasonal structure to survive advanced structural decay for *c.* 30 years.

7.3.3 Archaeological Evidence

In this section a number of archaeological features that may help to reveal evidence for the duration of structure occupation will be discussed. First, I will discuss the evidence for structural repair including evidence for rethatching and rebuilding activity, as well as evidence for the employment of preventative methods against wood decay. Second, I will consider wear erosion and the evidence provided for maintenance activities, including hearth renewal and reflooring activity; followed by other features, namely the silting and recutting of drainage-gullies and the formation of 'occupation soil'. We will also discover to what extent a lack of finds helps in determining the duration of a structure's occupation.

Repair

It is assumed that post replacement is an indicator of structural decay and, following Bersu (1948-49; 1977), the duration of a structure's occupation can be assumed from evidence for structural repair. As shown in 7.2.1, repair is in evidence in a minority of structures. Of those structures with suitable evidence, two out of three structures showed no evidence for repair, implying that these structures had been abandoned by the time structural repair had become necessary. The majority of circular structures, therefore, were used for no more than *c.* 60 years. Around one in four structures did have evidence for structural repair and these examples may indicate a lifespan in excess of *c.* 60 years. Alternatively they might reveal an accelerated decay rate, perhaps because of any one of a number of factors, in particular soil type for example; perhaps because of the practice of episodic abandonment. It has been suggested, for example, that seasonal structures had a potential lifespan of *c.* 30 years: 2% of structures were subjected to excessive rebuilding activity and it is these examples which are most securely interpreted as seasonal structures. Only one in ten structures had been rebuilt before repair became necessary. The majority of these sites would have been use for a maximum of *c.* 120 years: perhaps for substantially less than that figure depending on when, and for what reasons, rebuilding took place.

Hearths

The archaeological record reveals very little evidence for hearth renewal: just ten structures or 2% of those with suitable data. Traditionally this is taken as an indicator for the short duration

of structure occupation. In five of these structures, the hearth had been replaced only once; in two it had been replaced twice; and in three it had been replaced three times. Observation at the *Greenbogs House* indicated that complete replacement of hearthstones might occur without leaving any archaeological trace of the original setting. So long as renewal manages to take place without causing disturbance to the original surface, the hearth that we excavate may only represent the final phase in a much longer sequence. In effect, it may only be the 'terminal' hearth that remains. Any burning of the soil or rock floor from an earlier phase would naturally be ascribed to the hearth excavated. At Wardend (Aberdeenshire) it was noted that only one hearth had been utilised during at least two structural phases (Russell-White 1995, 25).

Nevertheless, Coggins & Fairless (1984) estimated that a setting of hearthstones might last for between one and three years. For the three superimposed hearths at Bracken Rigg (Co. Durham) they suggested a maximum duration of perhaps ten years (Coggins & Fairless 1984, 14). At Buiston Crannog, however, the hearth in CS A was replaced every two years and that in CS B was replaced every five years (Barber & Crone forthcoming, 3). Being based on dendrochronological evidence, the latter is a more secure figure than the Bracken Rigg estimate. Only ten structures provided evidence for hearth renewal. 50% had been replaced only once and if we use the Buiston evidence as a guide this implies occupation of between 4-10 years. 20% had been replaced twice (6-15 years); and 30% had been replaced three times (8-20 years). This suggests that structures were occupied for less than a generation, most for less than 15 years. Of course these figures are based on *wetland* evidence from the 1st millennium AD and, as a result, may be unrepresentative. The hearth is generally insensitive to the passage of time and a lack of evidence for hearth renewal is a poor indicator for determining structure duration.

Floors

At all but one of the sixteen sites with evidence for re-flooring this activity apparently took place only once. At the remaining site the floor was relaid several times due to subsidence, as the structure had been built on top of a filled in drain (Longley *et al.* 1998). Three structures had clay floors which are presumably especially liable to wear. At fourteen other sites, a ring-ditch or wear-gully (see 6.2.2) in the periphery of the structure, had been re-levelled with paving, one - Milking Gap CS 1, Northumberland (Kilbride-Jones 1938) – being filled with stones first. The evidence shows a real bias towards the ring-ditch structures of Angus and East Lothian and such structures may not provide evidence for longevity of use because of the additional wear sustained by animal traffic. From this evidence it can be suggested that structures did not tend to suffer wear erosion – as a result of human traffic – which was sufficient enough to warrant re-flooring. This could indicate either short duration occupation or the use of organic flooring. As such, evidence for floor renewal is not seen as a useful way to gain an estimation regarding structure lifespans.

Deposit Formation

One in five of those structures with drainage gullies had had the feature re-cut at least once (fig. 7.13). It is often assumed that silting is a gradual process and that evidence for drainage-gully re-cutting must imply longevity of use. The Overton Down Experimental Earthwork Project, however, has revealed that in fact the majority of silting activity occurs in a relatively short period of time quite early on and as time progresses a state of equilibrium is reached (Bell *et al.* 1996, 230). Another argument for longevity has been the development of 'occupation soil': a dark/black, friable or 'sticky' soil often covering the floor area and containing minute fragments of charcoal, burnt bone and pottery. 115 structures (10%) revealed an occupation soil upon excavation. At Jarlshof (Shetland), however, these deposits have been reinterpreted as the accumulation of post-abandonment midden material (Cowley forthcoming, 4). It is suggested that experimental work on deposit formation must be conducted before we can accept the traditional explanation of 'occupation soil' as material accumulated during structure use rather than in the abandonment/post-abandonment period. At the *Pimperne House*, the accumulation of a soil, 0.25-0.30 m deep, was recorded around the central-ring supports, above their packing stones. However the soil lacked 'occupation soil' characteristics and there was no accumulation on the floor itself (Reynolds 1993, 109).

Finds

The lack of finds within a structure has often been taken as indicating a short-duration of occupation. At Culhawk Hill (Angus), for example, the finding of only one artefact (a spindlewhorl in the topsoil) appeared to support a 'short, and principally single phase, occupation' (Rees 1998, 120; 125). Similarly, at Middle Gunnar Peak CS 12 (Northumberland), the sterile nature of the floor and the absence of finds suggested that the structure might not have been occupied for any length of time (Jobey 1981, 64). A total of 363 structures in north and central Britain, almost one in three, are without finds (fig. 7.14). It must be recognised that a structure's assemblage is heavily influenced by *abandonment processes* (Schiffer 1987; Joyce & Johannessen 1993). As such, a lack of finds is likely to represent gradual abandonment and the effect of curational activity (see 8.2.1). It might also reveal the regular cleaning of the structure up to and including abandonment and the practice of off-site waste disposal. Taking these factors into consideration, a lack of finds is thought to be a poor indicator for determining structure duration.

Wear Erosion

Wear erosion on the floor of a structure is traditionally interpreted as evidence for structure longevity. At Lairg (Highland), wear/erosion on the floor of CS 1, CS 2 and CS 5 suggests a

'considerable longevity' and a 'considerable span of use'. This impression was reinforced by the measures taken to prevent further erosion in CS 2. Wear was found in just 5% of structures – one in eight of those with good enough evidence/recording. Just under half of this evidence is provided by ring-ditches. It has been suggested, however, that the *ring-ditch* is evidence for the stalling of animals (see 6.2.2). It has also been suggested that the feature – generally between 0.30-0.50 deep – can be produced in a relatively 'rapid' period because of the effect of animal trampling (Halliday forthcoming). The effect of human traffic, it is presumed, would be less dramatic. Six years after the completed construction of Peter Reynold's *Maiden Castle House* a 'shallow depression' was recorded in the entrance, after material had been eroded from the area by human traffic during wet weather (Reynolds 1979, 36). On the earth floor of the *Pimperne House*, 15 years of use produced wear in the central area – the main area of use – to a depth of 0.15 m (Reynolds 1993, 112), or *c.* 10 mm per year.

26 structures from 20 sites - 9% of those with suitable data - provided evidence for wear on an earth floor. The depth of non-*ring-ditch* wear-gullies is between 0.10-0.15 m (see 6.2.2) which, if we use the Butser rate, implies a duration of occupation somewhere in the region of 10-15 years. In the *Pimperne House* each doorway presumably sustained above-average traffic due to high visitor figures. Thus, the figure of 10-15 years could at the very least be doubled to 20-30 years. Wear on a rammed earth floor is even slower, as observed at the *Thirlings House* at Bede's World in Jarrow, where the presence of wear could not be observed, despite ten years of use. The use of mats at places on the *Pimperne House* was revealed to have protected the floor from wear in that area (Reynolds 1993, 112). Equally, the use of vegetation: straw or heather, for example, or even plank flooring, would help to delay the effects of foot traffic. All of these measures render themselves invisible in dryland archaeology.

Nineteen structures from 11 sites - 8% of those with suitable data - provided evidence for wear on a stone floor. Unfortunately the depth of such wear went unrecorded by the excavators. The extent of wear on stone was recorded at the 19th century jail buildings in Inveraray, Argyll (figs 7.15-7.16), and a breakdown of use is shown in table 7.9. The 65 years when the jail buildings saw only light use might help to counteract the current-day use which is very high. Since becoming a tourist attraction the jail has maintained an average visitor figure of *c.* 400 people per day. Whilst the overall degree of use is perhaps still quite high compared to what can be assumed for a circular structure, table 7.9 does help to illustrate that wear *on stone* is a real indicator of the passage of time. The evidence reveals wear amounting to just 10 mm every 25-35 years. Worn floor slabs were recorded at Lairg CS 1 and CS 4. In CS 1, one slab was so heavily worn that it was initially mis-identified as a quern (McCullagh & Tipping 1998, 38-52). The residuality of these slabs is of course a possibility (Halliday forthcoming). At Crock Clough East (Scottish Borders), the amount of wear on the threshold stone: "indicates an occupation of

considerable duration, to be measured in centuries rather than in years" (Steer & Keeney 1946-47, 156). Here again, reuse must be considered.

	Stone	Normal Use	Light Use	Heavy Use	Total Use	Wear
Courthouse	Greywacke	1820-1889	1889-1954	1989-present	137 yrs	c. 40 mm
New Prison	Sandstone	1848-1889	1889-1954	1989-present	109 yrs	c. 40 mm

Table 7.9 Wear on stone at Inveraray Jail (Argyll)

As shown, the evidence for structure lifespans from wear erosion is rather limited. What little evidence there is suggests occupation for c. 20-30 years. Just 8% of stone-floored structures reveal evidence for wear. This does imply a degree of longevity, as just 10 mm of wear indicates c. 30 years of use. In total, however, only 64 structures (5%) revealed evidence for any type of wear. It must be assumed then, that either the majority of structures were in use for a limited period of time; or that measures were normally taken against floor erosion, such as the provision of organic flooring.

7.4 Discussion

Table 7.10 summarises decay rate information from wood microbiology and experimental archaeology, alongside evidence for the wear and repair of circular structures in the archaeological record. From this evidence it has been suggested that the average *structural* lifespan of a circular structure is in the region of 60 years. The *cultural* lifespan of a circular structure may, however, be somewhat less than its *structural* lifespan. Ethnography reveals that many structures never reach the end of their potential use-life but instead change function with age, are extensively remodelled, or are abandoned for a variety of social reasons, often related to the developmental cycle of the domestic group (Brück 1999b; Cameron 1991, 170). Rothschild *et al.* (1993) established that prior to abandonment, structures associated with Zuni pueblo in New Mexico had three different functions: the original use for full-time living; followed by use for part-time living; and finally use for storage. For the Fulani of Mauritania, a deteriorating sleeping hut might become a kitchen; whilst a deteriorating kitchen might be used as a storage hut or an animal pen (Oliver 1987, 38). This might go some way to explaining the evidence from artefact assemblages regarding the apparent multi-functional nature of structures (see 6.4).

There is certainly a lack of archaeological evidence for occupation in excess of one generation in the majority of structures (table 7.10). Whilst the average structural lifespan of a circular structure may have been sixty years it is suggested that only a proportion of that period – perhaps only one generations worth – was engaged in habitation. Almost two in three circular structures in Northern Britain are not repaired. This accords fairly well with Brück's Middle Bronze Age evidence from southern England where 75% of structures are not repaired: slightly

more than in the north (1999b). From this data Brück identified the dominance of what she called the *single-generation model* where structures are occupied for just one generation and then abandoned. This model is accepted for the north British data, as it has been for prehistoric houses in the Netherlands (Gerritsen 2001). Perhaps in some communities it was unacceptable to reuse the site of a structure, for example, following the death of the household member(s) with whom it was associated.

Previous Estimates	1940s - e.1970s	Hogg (1969b)	l.1970s - 1980s	Wetland Data	Halliday (forthcoming)	Gerritsen (2001)
	30-50 yrs	10-30 yrs	100 yrs	20 yrs	5-10 yrs	25-35 yrs
Wood Decay Experiments	Erosion	Failure (exposed)	Strength Loss	Heartwood Decay	35% Failure	Thatch Decay
	0.01-0.07 mm p.a.	10 yrs	negligible	120 yrs	90-95 yrs	10-60 yrs
Experimental Archaeology	Sapwood Decay	Porch Post Repair	Structural Repair	Wear: Earth	Wear: Stone	Thatch Repair
	7-8 yrs	10 yrs	29 yrs	50 mm/decade	3mm/decade	10-15 yrs (straw)
Archaeological Evidence: Repair	None	Repair	Possible Repair	Rebuilding	Both R & R	Excessive Rebuilding
	65%	18%	4%	8%	4%	2%
Archaeological Evidence: Other	Hearth Renewal	Lack of Finds	D-G Recutting	Devt. of Occ. Soil	Floor Wear	Floor Renewal
	4-20 yrs	NA	?	NA	c. 25-30 yrs	NA

Table 7.10 Summary of information regarding lifespan estimates

In north and central Britain, one in six circular structures was repaired. Timber structures are more likely to be repaired than hut-circles; however there is little variation between the two regarding which elements are repaired (fig. 7.17). This reveals that in structural terms they are very similar. Repair takes place at one in four timber structures and one in fourteen stone-built structures. Even allowing that this may be due, in part, to the lack of excavation of stone walls; these highly divergent figures may still reveal that stone-built structures are repaired much less often than those of timber. This is perhaps only to be expected. Whilst it is traditionally assumed – as a result of this fact - that stone-built structures had a longer use-life than timber structures, new research indicates that this was not necessarily the case, and in fact the opposite may be true. Those timber structures constructed using less durable stakes and planks, were repaired less often than their post-built counterparts revealing that these structures also had a shorter duration of use.

In north and central Britain, one in ten circular structures was rebuilt. Timber structures are also more likely to be rebuilt than hut-circles. Again, the same caveat must be observed regarding the excavation of stone walls. Only one in twenty-five stone-built structures were rebuilt, compared to one in seven timber structures. However, rebuilt hut-circles are more likely to

receive multiple rebuilds than their timber counterparts. Three out of four rebuilt structures were rebuilt only once; one in four were rebuilt more than once. Most houses are rebuilt during a period of household decline, although a significant proportion (one in three) are rebuilt during household growth. Of the timber structures, one in four were repaired prior to rebuilding, which might be evidence for longevity with rebuilding taking place as a result of advanced decay. Alternatively, it might be evidence for repair following an episode of abandonment.

If we look at the maintenance data chronologically (fig. 7.18), we find a steady rise in maintenance activity throughout early prehistory, reaching a peak in the MBA. Between 1000-800 BC there is a dramatic 40% drop in these activities after which time there is relative stability. In southern England it was found that one in five MBA structures were repaired and only one in fourteen rebuilt (Brück 1999b, 146). The MBA data from north and central Britain reveals that one in two structures were repaired and one in ten rebuilt. More structures underwent maintenance in northern Britain than in the south. Looking at the northern data regionally, it is the upland areas where we see a break from the norm. In Highland Scotland a greater proportion of structures are repaired than in other regions (fig. 7.19) and in Highland Scotland and the Irish Sea region a greater proportion of structures are rebuilt. In general, multiple rebuilds are found more frequently in upland regions (fig. 7.20) with a greater number represented in northern England and southern Scotland. From these results we can conclude that structures underwent more maintenance in upland environments. We might expect this to some extent because of increased rainfall in these areas but perhaps not quite to the degree shown. Instead, we might suggest that in northern Britain, landscapes - in particular upland landscapes - were used more diversely than those further south.

If we look at the maintenance data in more detail (fig. 7.21) we find that a high degree of rebuilding activity in the LrNeo declines over the next 1000 years, so that by the MBA repair activity is dominant. At 1000 BC there is a dramatic increase in rebuilding activity followed by its equally dramatic decline again at around 800 BC. Over the remainder of the 1st millennium BC there is again a gradual increase in rebuilding activity, followed by its decline in the early 1st millennium AD. Houses in north and central Britain are frequently rebuilt on the same site in the LrNeo and at the beginning of the 1st millennium BC. Similarly, an increase in rebuilding activity has been noted in southern England during the LBA at sites like Reading Business Park (Berkshire) and Hengistbury Head (Dorset) (Brück 1999b, 146; 149). Fig. 7.22 reveals that the activities associated with the maintenance of circular structures is in a constant state of flux. Figs 7.18 and 7.21 reveal that the most rapid period of social change evidently takes place between 1000-800 BC. More gradual processes are at work between c. 2500-1500 BC and even more gradual are changes in later prehistory mostly in the early 1st millennium AD. But what do these patterns in the maintenance data represent?

They may be evidence for structure longevity but equally they might represent maintenance following an episode of abandonment. Such abandonment may be seasonal (winter) or over longer episodes in an increasingly mobile settlement system. Abandonment during the winter months accelerates the rate of decay meaning that, rather than longevity, maintenance activities might represent short duration occupation. Is repair more likely to be evidence for longevity, with rebuilding more likely to be evidence for (seasonal or episodic) abandonment? According to fig. 7.21, this would reveal high mobility in the LrNeo, LBA, and to a lesser extent in LrIA landscapes. Structures rebuilt only once are more likely to have a slope location whilst those with three or more are more likely to be situated in valley locations. Such a location would be unsuitable during winter. This might reveal that multiple rebuilds are more likely to be evidence for seasonal structures. According to fig. 7.22, these would reveal a greater use of seasonal landscapes generally in the 1st millennium BC.

If maintenance activities are evidence for longevity, the maintained structures in fig. 7.18 represent the multi-generation household: a lineage system. A lack of maintenance represents Brück's single-generation household. With this we see the early dominance of the single-generation model, with the growth of the multi-generation household throughout the early 2nd millennium BC reaching a peak in the MBA; followed by the rise to dominance again of the S-G household in the LBA. However this would mean that sedentism actually decreases in the LBA. Whilst contentious, this might explain the greater number of Iron Age structures in the record compared to the relatively small proportion of Bronze Age structures. One problem with this interpretation is that we might expect there to be a correlation between peak house size and the dominance of the multi-generation model. In fact, there is a discrepancy of at least 200 years between the two. It has been suggested that a system in which the multi-generation household is dominant reveals a low population and hence low resources (Cameron 1991). In this case we would be looking at a population boom in the LBA with the advent of the S-G model. It can also be argued that a decline in maintenance activities may reveal a shift from the more common repair of the multi-functional household to a more fragmented domestic sphere in the LBA, where the more common ancillary structures are allowed to decay naturally and only the main residence is repaired or rebuilt.

If maintenance activities are evidence for seasonality, maintained structures might be evidence for seasonal utilisation of upland landscapes or of flood plains; unrepaired structures may reveal year-round occupation of the more moderate lower slopes. In this case, the data might reveal a steady increase in the utilisation of seasonal landscapes in early prehistory reaching a peak in the MBA followed by a retreat from such landscapes between 1000-800 BC. This might be evidence to support the Burgess Model (cf. Burgess 1980; 1985). The numbers of unenclosed

roundhouses in upland landscapes apparently increase during the 2nd millennium BC. Arguably, rather than revealing an increase in population, this may be evidence for settlement mobility (S. Halliday pers. comm.). Similarly, rather than seasonality, maintenance activities could be evidence for short-duration occupations in a highly mobile shifting settlement system. A figure of five years has been suggested regarding unenclosed roundhouses in northern Scotland (Halliday forthcoming). If maintenance activities are evidence for mobility, the data might reveal an increase in mobility, reaching a peak in the MBA, with a move towards sedentism in the LBA.

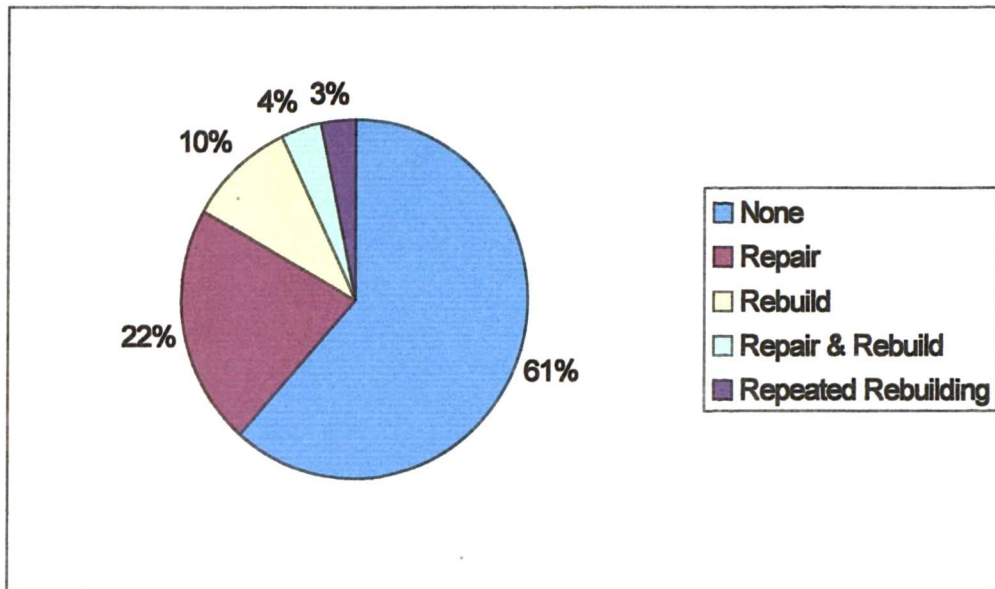


Fig 7.1 Maintenance activities in timber-built structures

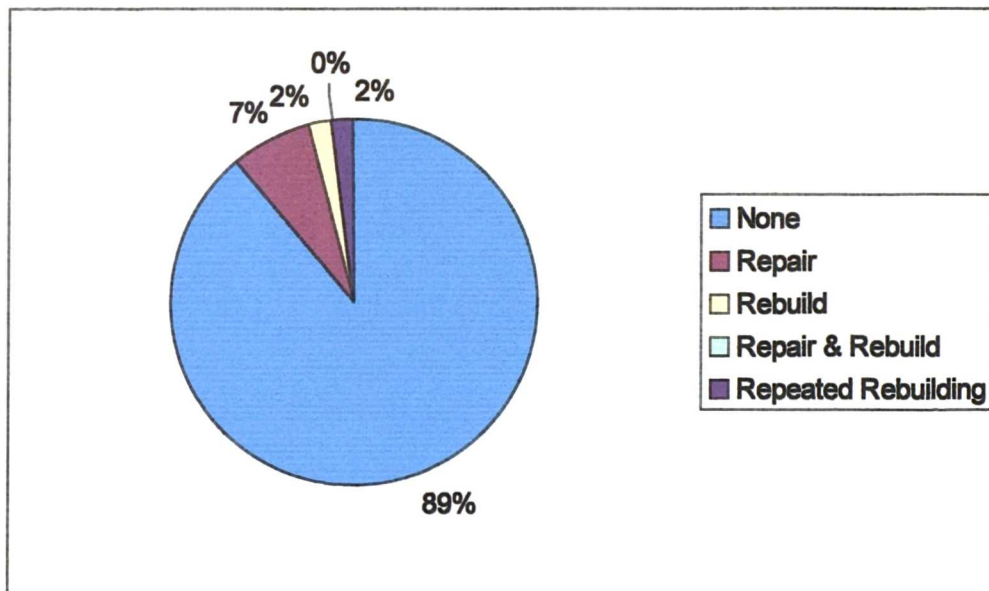


Fig 7.2 Maintenance activities in stone-built structures

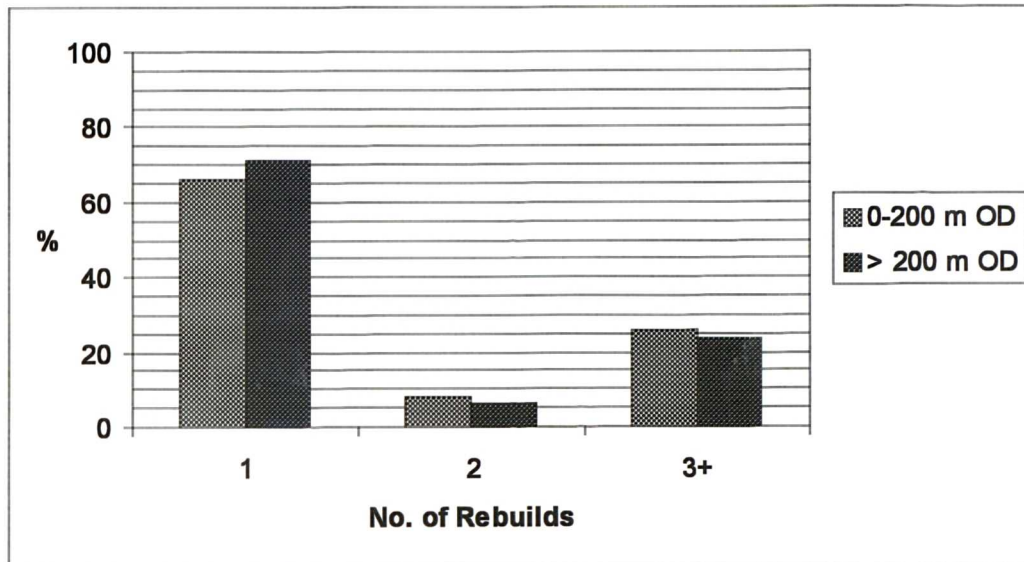


Fig 7.3 Rebuild activity and height above sea level

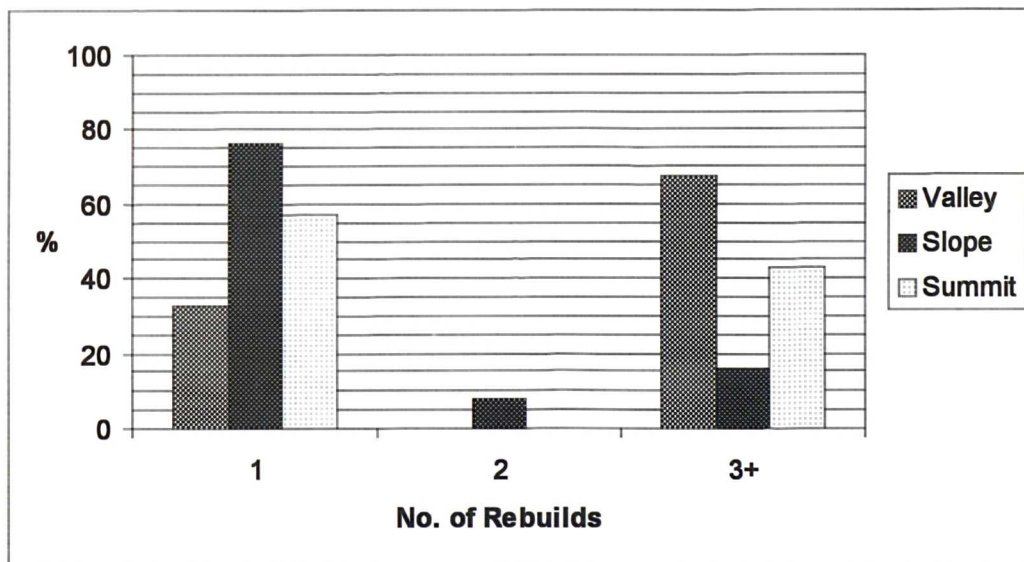


Fig 7.4 Rebuild activity and structure location

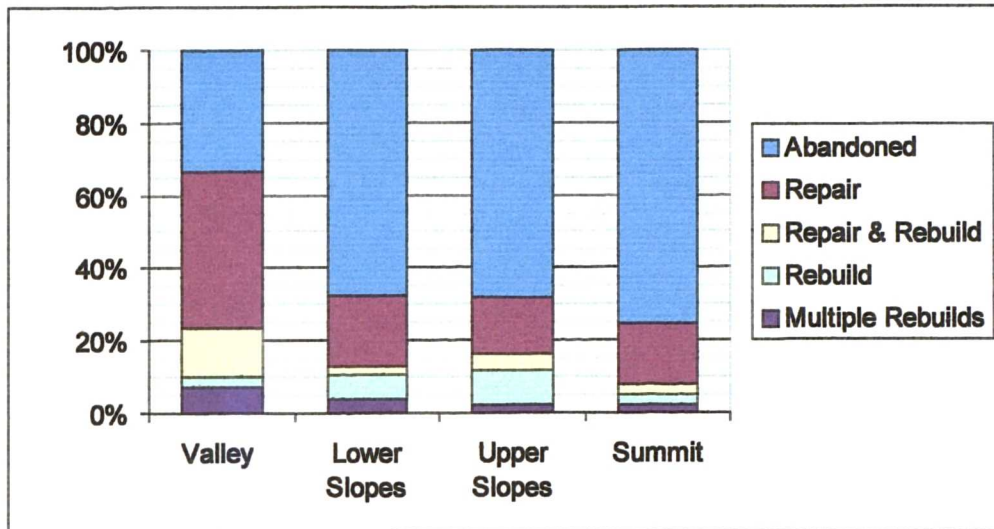


Fig 7.5 Maintenance activity and landscape position

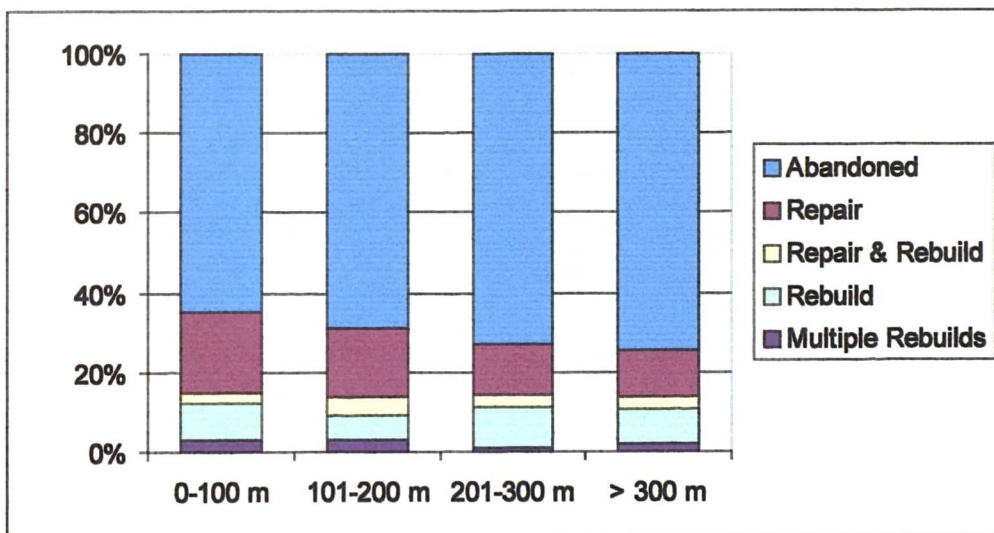


Fig 7.6 Maintenance activity and height above sea level

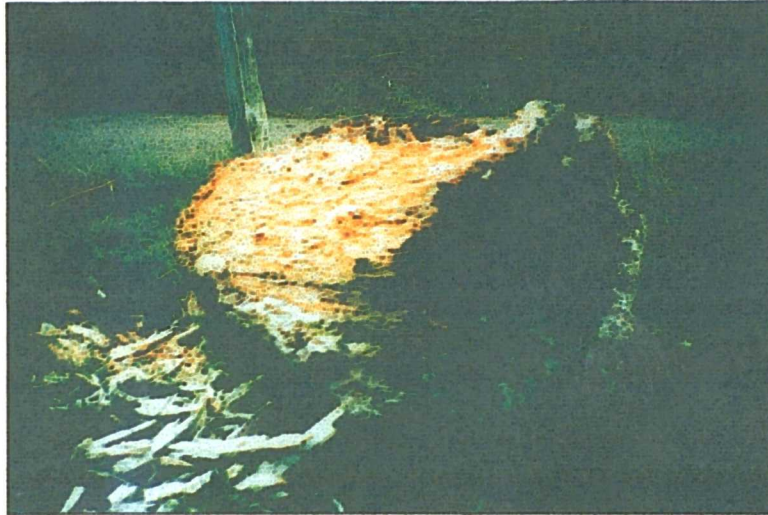


Fig 7.7 The physical decay of felled wood following insect attack



Fig 7.8 Developed post-end decay in the seasonally flooded *New Bewick Grubenhause* at Bede's World in Jarrow, Tyne & Wear

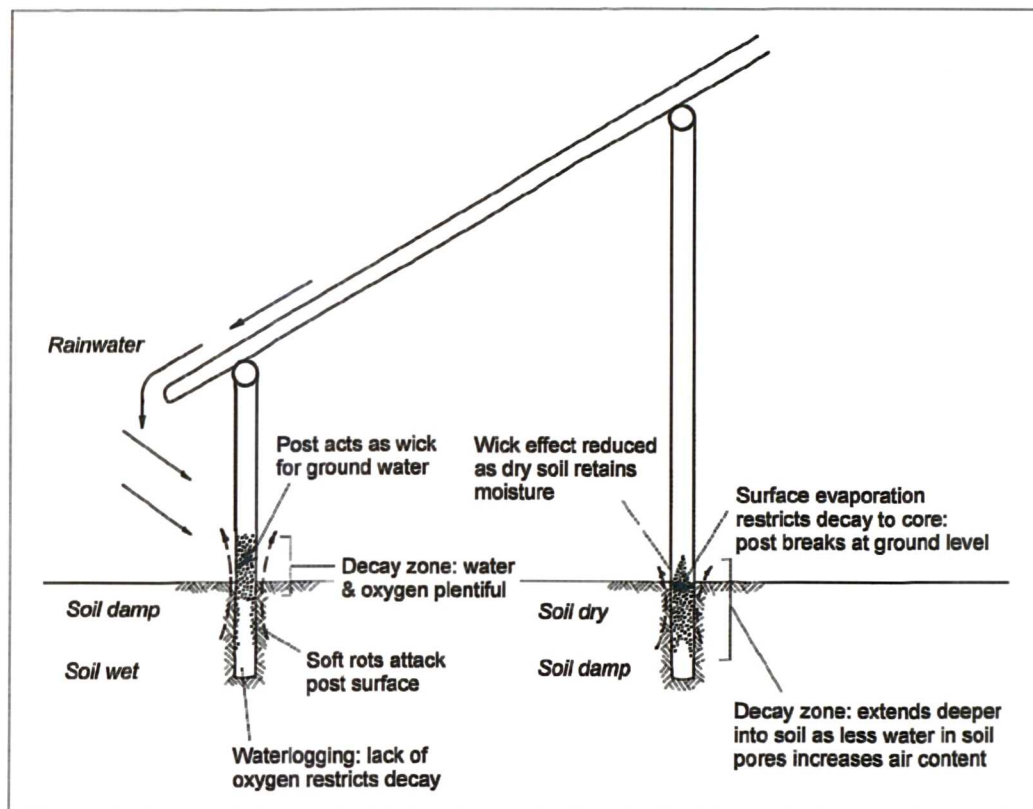


Fig 7.9 Differential decay in outer wall and central-ring posts (after Rideout 2000)

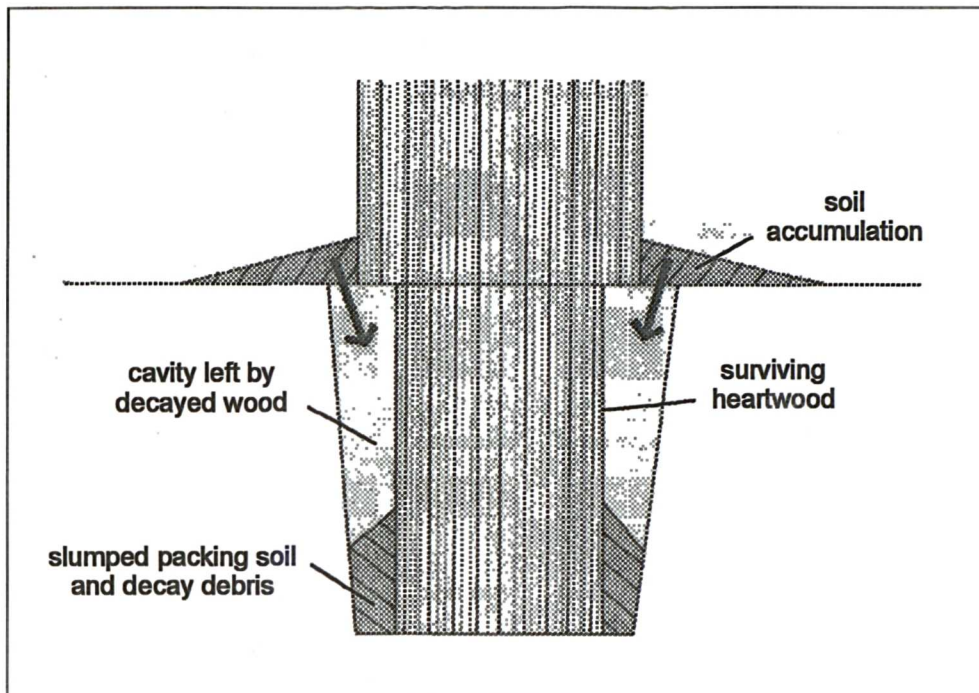


Fig 7.10 The formation processes surrounding sapwood decay in a posthole

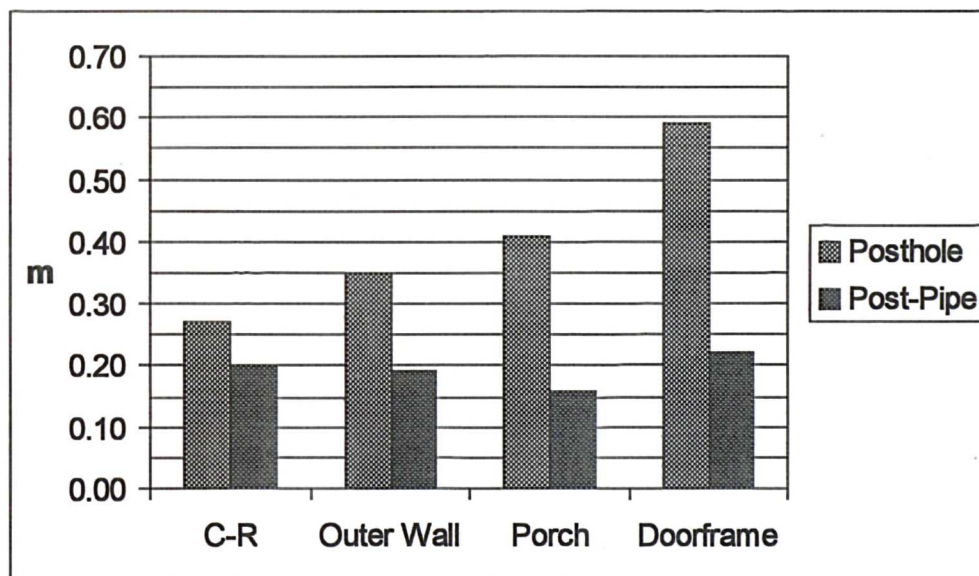


Fig 7.11 Differences between average posthole and post-pipe width



Fig 7.12 Storm damage at Bede's World in Jarrow, Tyne & Wear

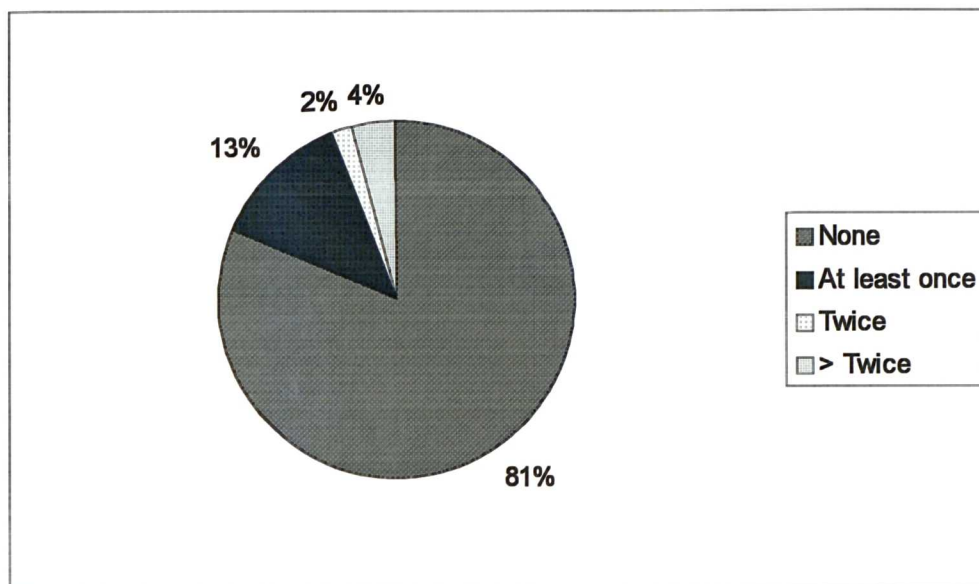


Fig 7.13 Evidence for the re-cutting of drainage-gullies

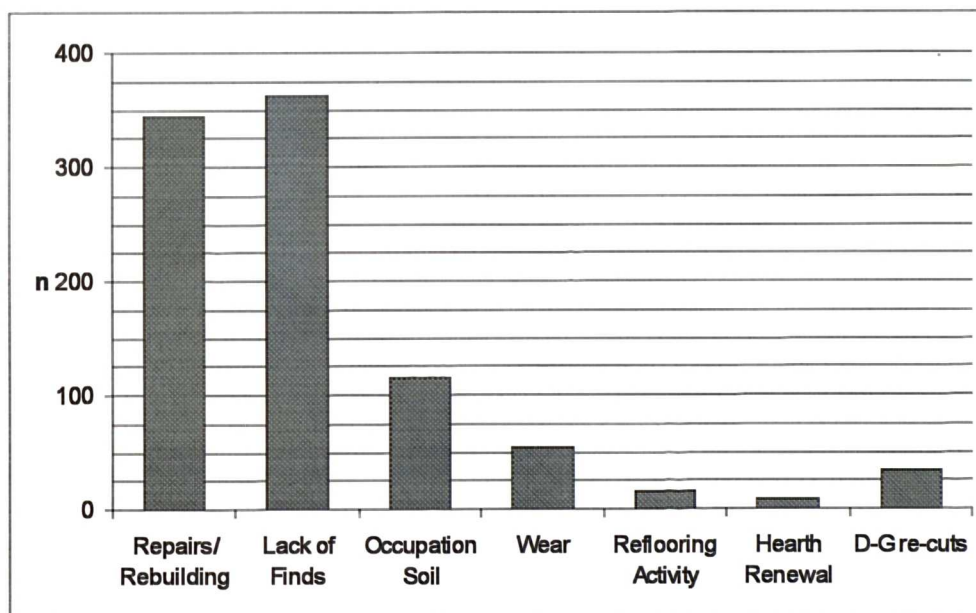


Fig 7.14 Incidence of factors which might be considered to reveal duration

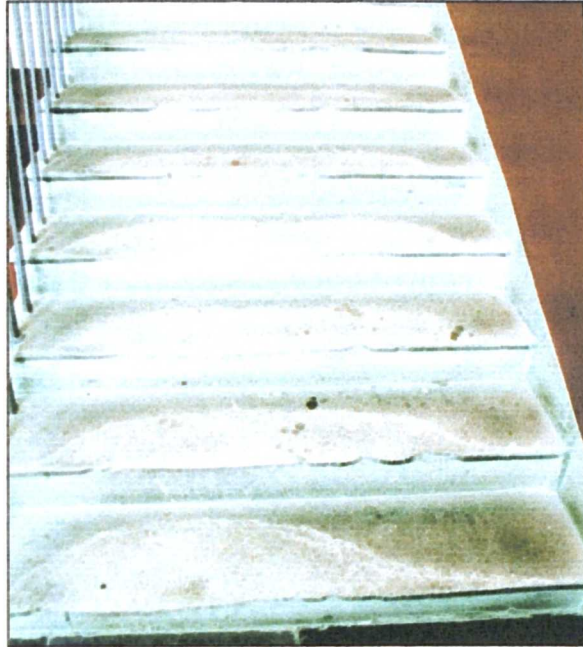


Fig 7.15 Wear on the courthouse stairs at Inveraray Jail, Argyll



Fig 7.16 Wear on the New Prison doorstep at Inveraray Jail, Argyll

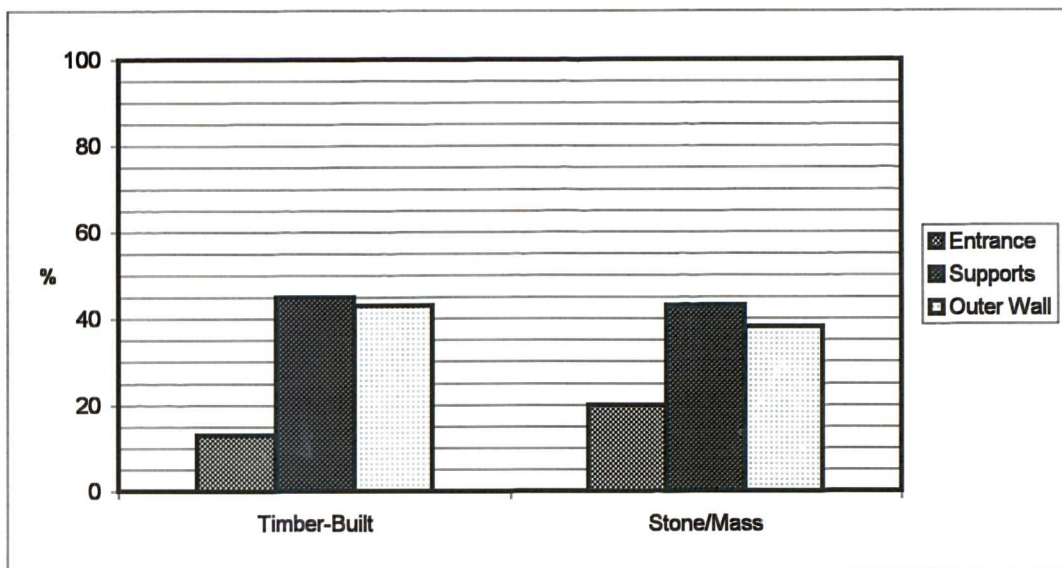


Fig 7.17 Structural elements repaired in timber and stone-built structures

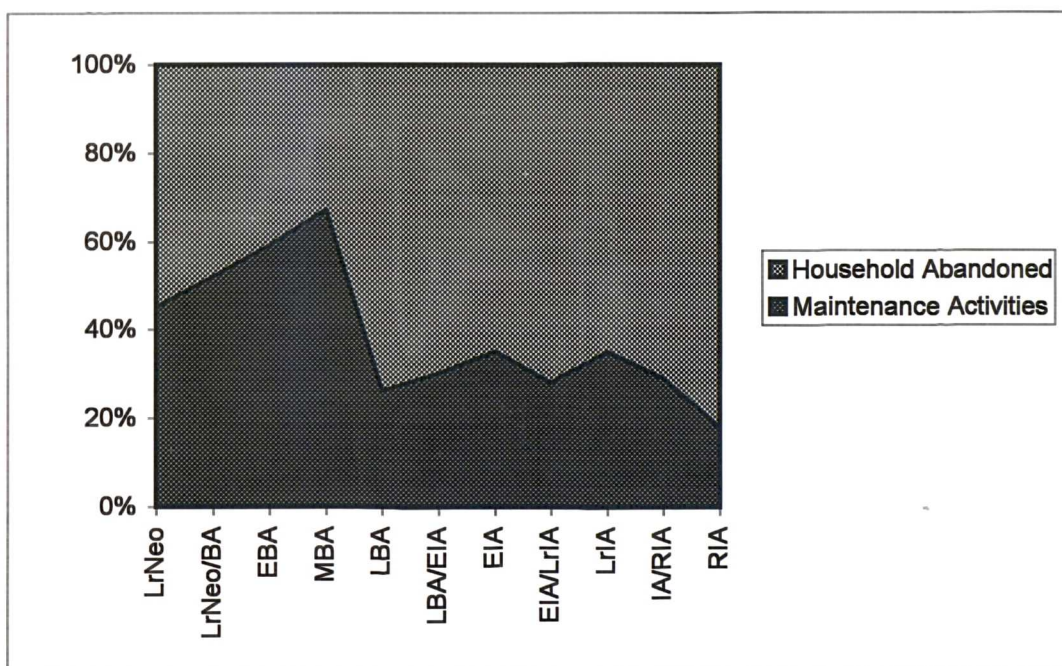


Fig 7.18 Chronological distribution of maintenance and abandonment

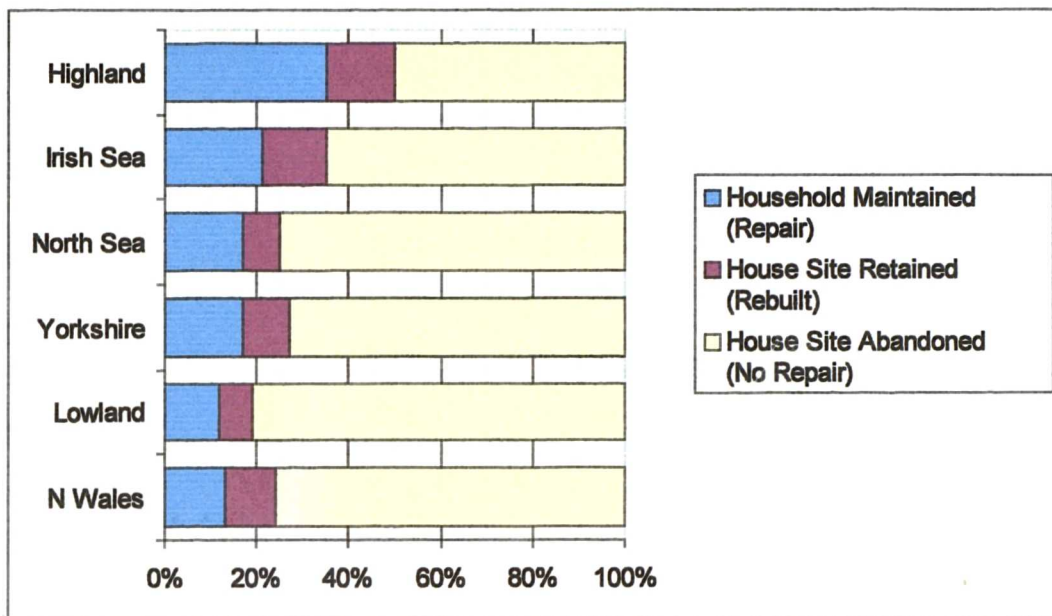


Fig 7.19 Regional distribution of maintenance activities

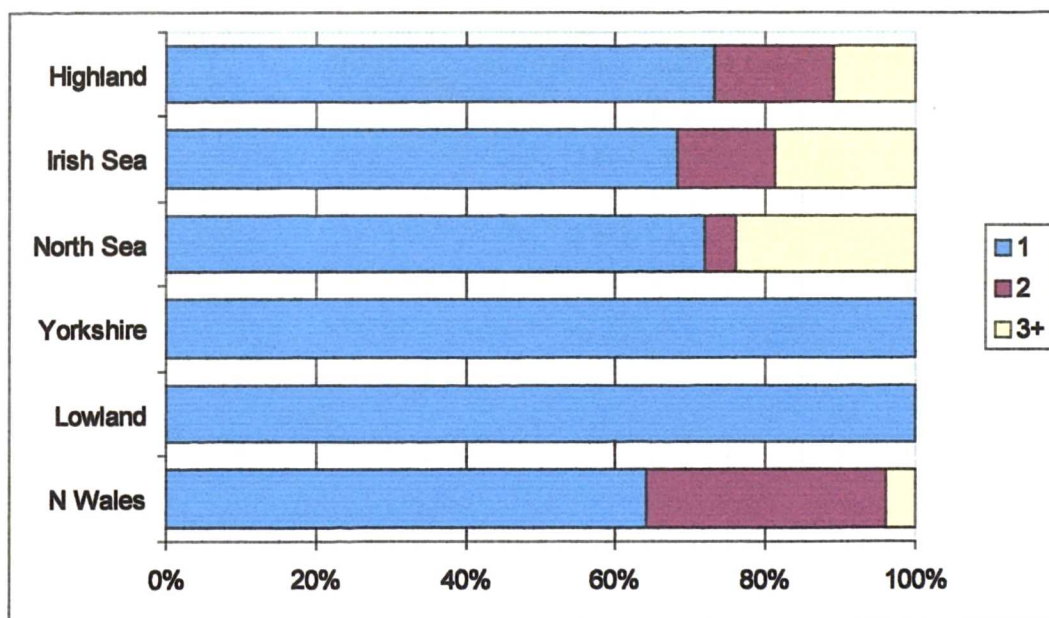


Fig 7.20 Regional distribution of multiple rebuilds

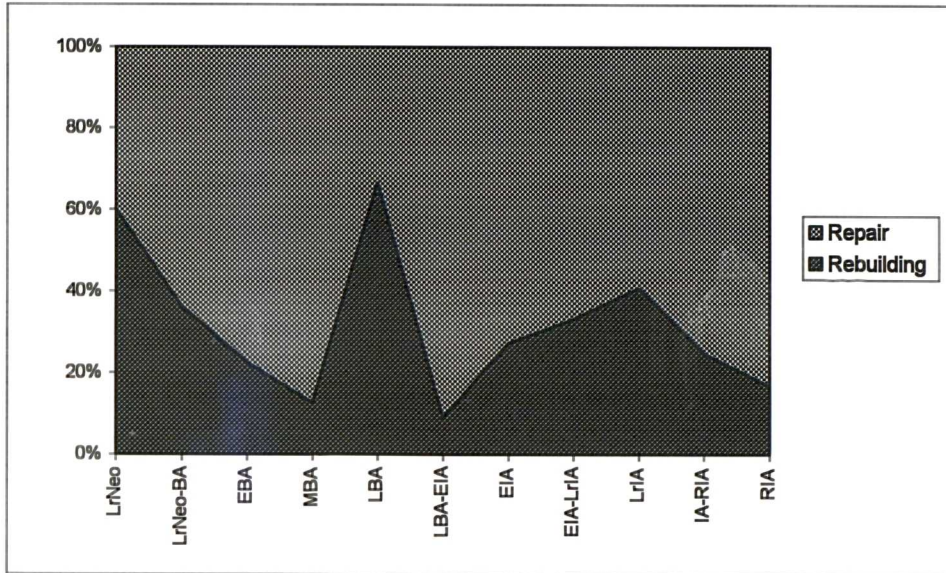


Fig 7.21 Chronological distribution of maintenance activities

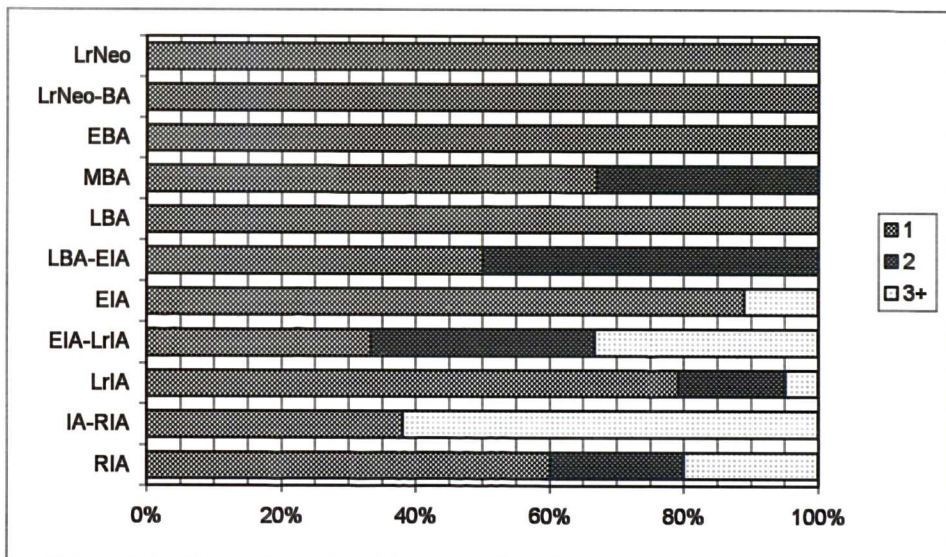


Fig 7.22 Chronological distribution of multiple rebuilds

Chapter 8 Abandonment

"Abandonment is an important stage in the formation of an archaeological site; in order to interpret sites accurately, archaeologists must understand abandonment processes"

(Cameron 1993, 3)

8.1 Introduction

Understanding the events surrounding the abandonment of structures is one way of gaining an understanding of past social behaviour; one that has been consistently overlooked. There are several different types of abandonment: seasonal, episodic, and permanent; each of which can operate at both household and settlement level (Brooks 1993, 178). The aim of this chapter is to characterise prehistoric abandonment processes. When, for example, does abandonment take place and for what reasons? What do people do when they abandon their house? Do they return? This chapter will look at the events and deposits surrounding abandonment: how can we identify them and what do they tell us about social behaviour? The third section identifies processes which occur in the post-abandonment phase: collapse and decay. Critically, how do these processes alter the archaeological assemblage?

8.2 Abandonment

It is not often acknowledged that all archaeological structures have been abandoned (Cameron 1993, 3) – whether or not that was the original intention of the occupants. Over the past 25 years a sub-discipline has evolved in the US which has sought to understand the formation processes involved in abandonment (Binford 1979; Stevenson 1982; Schiffer 1987; Cameron & Tomka 1993). As a result of this work it is now widely accepted that house-floor assemblages are directly influenced by what have been termed *abandonment processes*. In other words, evidence for the use of the structure has, in the vast majority of cases, been heavily distorted by behavioural practice which can be ascribed to at least one of a number of processes involved in the abandonment of the structure. This section will begin with a consideration of abandonment processes, followed by a review of the evidence for prehistoric abandonment deposits, salvaging activity, and the destruction of structures by fire.

8.2.1 Abandonment Processes

There are a number of *abandonment processes* that affect a structure's assemblage. The first is *curate activity* (Schiffer 1987) - the removal of objects on abandonment for use in the new household. The second - *caching activity* (Binford 1979) - is the storage of objects within the

structure for future use during an anticipated return to the structure. The latter results in the accumulation of *de facto refuse* – the deposition of still-usable objects not necessarily discarded as waste. Thirdly, on abandonment, normal cleaning routines are suspended and attitudes towards disposal change. This leads to dumps of secondary refuse – or *abandonment refuse* – in areas that were previously reserved for activity (Schiffer 1985, 27). Factors that influence abandonment processes - and thus have a direct effect on the abandonment assemblage - include: the rate of abandonment, the degree of planning, and whether or not return is anticipated (Stevenson 1982). In addition, abandonment processes will be affected by any social customs centred on abandonment, such as the performance of any closing rituals (Cameron 1993, 5).

Caching activity does not take place on the permanent abandonment of a settlement. The act of caching implies the anticipation of the future use of the deposited objects. Such activity is affected by the degree of mobility in a settlement system. For example, some semi-mobile communities consider certain types of artefact to be what Binford called *site furniture*. These objects are seen as a feature of the site, to be used by any occupant but to remain with the site when the people depart (Binford 1978, 339). Among the Nunamiut Eskimo, for example, the most common types of site furniture are the hearth, its furniture and cooking vessels; and certain utilitarian objects such as pounders, hammerstones and scrapers (Binford 1979, 264). *Site furniture* then, for portable artefacts, represents a variant of caching activity.

Curate activity - the removal of still-usable items on abandonment - leaves a depleted assemblage (Schiffer 1987, 89-91) and varies according to whether abandonment was gradual or rapid and whether or not return was anticipated (Stevenson 1982, 252-253). The curation of objects is also dependent on the means of transportation (Schiffer 1987) and the distance to the new site (Cameron 1991). For example larger items are less likely to be curated and more likely to become *de facto refuse* (Schiffer 1987, 95). We might see the deposition of querns in this context. If distance to the new site is great and the means of transportation limited then the occupants must prioritise which objects are to be transported and which are to be left behind as *de facto refuse*: this can be called *selective curation*. If, on the other hand, the new site is relatively close, one might expect short-term caching followed by abundant curate activity (Lightfoot 1993, 166-168). The 'replacement cost' of an object (Schiffer 1987, 96) and its 'personal value' (Lightfoot 1993) are other factors which influence an artefacts curate potential.

Ethnography reveals that the abandonment of settlements is most often a gradual or planned process (Cameron 1993, 4). For the Native American Pawnee, for example, permanent abandonment was planned up to two years in advance to ensure that the necessary materials could be obtained for the construction of a new structure (Brooks 1993, 179-180). In his key

work on the abandonment of gold rush settlements in the Yukon, Stevenson (1982) compared the assemblages produced by gradual and planned abandonment against those of rapid and unplanned abandonment. The degree of planning was known from historical records. He concluded that: "few artifacts and features will be found in processes of manufacture, use, or maintenance on sites abandoned under normal or planned conditions" (Stevenson 1982, 241). If abandonment had been rapid and unplanned Stevenson found that there would be several telling characteristics within the assemblage: 1) evidence that manufacture/maintenance was still in progress; 2) the abundance of *de facto* refuse; 3) an abundance of would-be curated items; 4) the deposition of *de facto* refuse in its activity loci; 5) little secondary refuse/abandonment refuse' in living areas (*ibid*).

As a development of Stevenson's (1982) work, Lightfoot (1993) provides four model assemblages according to whether or not return was anticipated (table 8.1). In addition, Brooks (1993) defines several increasingly archaeological characteristics of planned/unplanned abandonment (table 8.2). In order to apply the principles advanced by those working on formation processes and in particular the work of those mentioned above, an attempt was made to characterise the assemblages on 140 prehistoric floors: all those with suitable data (fig. 8.1). Potsherds, which do not contribute to restorable vessels – the most common find type in the archaeological data - represent the abandonment refuse of planned abandonment (Brooks 1993, 185-186; Lightfoot 1993, 170). Food refuse was also placed in this category. *De facto* refuse consists of *in situ* quernstones, coarse stone tools, pot-boilers, spindlewhorls, loomweights, and flint tools. In addition, the proportion of utilitarian finds as opposed to valuable/personal items – eg jewellery and metalwork – was assessed (fig. 8.2). This is a highly generalised exercise but an attempt to advance this method which, it is expected might prove extremely useful in local-level analyses.

	Planned Abandonment	Unplanned Abandonment
Return Anticipated	1) caching of valuable items away from activity areas 2) little <i>de facto</i> refuse in activity areas	1) little caching of valuable items away from use locations 2) <i>de facto</i> refuse found in activity areas
Permanent Abandonment	1) no caching of valuable items 2) abandonment refuse abundant in living areas: concentrated arrangements	1) items of personal value curated 2) abandonment of common, replaceable, utility items as <i>de facto</i> refuse

Table 8.1 Lightfoot's (1993) development of Stevenson's (1982) hypothesis

	Planned Abandonment	Unplanned Abandonment
Structural Timbers	Salvaging Activity	Decay <i>in situ</i>
Artefact Size	Smaller items	Larger items
Ceramics Refit Sequences	Few	Many
Spatial Distribution of Finds	Clustering	Uniform

Table 8.2 Indicators for planned/unplanned abandonment (Brooks 1993)

Thus the low amount of primary refuse and the high degree of abandonment refuse in prehistoric assemblages reveals planned and permanent abandonment. This corresponds well with the ethnographic record (Cameron 1993, 4). The high degree of *de facto* refuse would be explained by Lightfoot (1993) as revealing rapid/unplanned abandonment with an anticipated return, so too would the high proportion of personal items. Likewise the high number of utilitarian items would reveal unplanned but permanent abandonment. It is suggested, however, that the very high number of valuable items might in fact be evidence for 'closing deposits' (cf. Brück 1999a). Equally that the *de facto* refuse is predominantly made up of small utilitarian items might instead indicate *selective curation*: because of the replaceability of such objects. Alternatively, such items may have been considered as *site furniture* (Binford 1978; 1979). Or is it that what we see as low-value utilitarian items such as coarse stone tools and spindlewhorls are actually personal items of just as much 'value' to their owners as those objects which we imbue with value such as metalwork and foreign goods. This might be confirmed by the existence of perforated whetstones, for example, which suggest suspension and the elevation of the object to the status of a personal item (Hunter forthcoming).

After Lightfoot (1993), it can be assumed that an assemblage *indicative* of rapid abandonment might also imply that the means of transportation were limited, and distance to the new site was relatively far. Such an assemblage might also be the result of any one of a myriad of culture-specific social customs. The treatment of a house and its assemblage depends on how a community deals with, for example, the sudden death of a resident. Brück has recently criticised the concept of caching activity suggesting that it is heavily influenced by modern efficiency values. Instead she suggests that finds on MBA floors might actually be evidence for 'closing deposits' as opposed to their overtly functionalist interpretation as evidence for rapid abandonment (Brück 1999a, 330). We can be fairly sure that some caching activity *did* take place in prehistory but we must remain aware that assemblages may also reveal evidence for behaviour which might *not* correlate with functionalist expectations. It is only by being aware of abandonment processes that archaeologists working with domestic assemblages will be better informed about what such an assemblage might represent in terms of past human behaviour.

8.2.2 Abandonment Deposits

It has been established that several *abandonment processes* directly affect the house-floor assemblage. *Curate activity* depletes the systemic assemblage, *caching activity* and *selective curation* create *de facto* refuse, and the suspension of normal maintenance activities leads to the accumulation of *abandonment refuse*. As a result - except in cases of catastrophic or ritual abandonment - most house-floor assemblages consist of *de facto* and/or abandonment refuse and, relative to the systemic inventory, such assemblages are somewhat depleted (Schiffer 1987,

97). Table 3.4 reveals those contexts most likely to contain objects deposited on abandonment. These are the horizontal interface (floors); the hearth; non-structural feature fills (pits, drainage gullies etc.); and occupation soil. Using the data in Appendix 3 two different analyses were carried out (see 3.1.5) and from fig. 8.3 it was possible to discover which finds category was represented least and which most for each context.

Horizontal Interface

Finds deposited on the horizontal interface are most likely to be attributable to abandonment (see 8.2.1) but can also represent structure use in some instances. Floor surfaces have the greatest proportion of both fixtures and fittings and also personal items such as jewellery and clothes fasteners (fig. 8.3). The finds with above and below average distribution on floor surfaces are shown in table 3.5. Thirteen structures - all of which are RIA in date and all but one from Northumberland - revealed iron nails on their floor. It is assumed that these represent nails utilised in the superstructure; alternatively they may be the remains of furniture (F. Hunter pers. comm.). Otherwise, finds associated with the horizontal interface seem to be, on the whole, somewhat 'personal' items (see Appendix 4.5). Finds least likely to be found on floors seem to be generally associated with craftworking activities.

Hearths

Because of its nature, any objects deposited in the hearth whilst it is still in use would be destroyed. As a result intact finds in hearths may provide solid evidence for so-called 'closing deposits' (Brück 1999a). The data revealed that, of all contexts, hearths were more likely to produce display metalwork. Those finds with a less than average occurrence cannot be easily grouped. Interestingly, whilst the debris from cannel coal-working finds its way into the hearth, smelting debris does not: suggesting each had a different location, the former inside the structure the latter elsewhere. Fig. 8.3 confirms that hearths do have the greatest proportion of display finds, such as fine metalwork (see Appendix 4.4).

Non-Structural Feature Fills

The fill of non-structural features, such as pits and drainage-gullies, could have been deposited in the period of construction, use, or abandonment. The usual lack of stratigraphy means it is generally impossible to tell to which of these phases a feature cut belongs, never mind its fill. Non-structural feature fills have the greatest proportion of finds associated with food preparation - in particular quernstones (see Appendix 4.7) - and the least of both fixtures & fittings and craftworking (fig. 8.3). Nevertheless there is an above average occurrence of metalworking debris (table 3.5). Other finds types with an above average distribution in these contexts are plant remains (see Appendix 4.6) and imported tablewares.

Occupation Soil

In general 'occupation' soil seems to have a lack of what have been considered to be personal finds. It does, however, have an above average occurrence of shell, briquetage, and craftworking debris. It has already been suggested that so-called 'occupation soil' might actually be a deposit formed in the abandonment/post-abandonment period. As with all contexts, occupation soil has food preparation objects as its main constituent. It does, however, have a 4% above average proportion of foodstuffs – which might explain the inclusion of shell. Work at Zuni pueblo in New Mexico attributed a high proportion of foodstuffs in the assemblages of abandoned structures to the accumulation of secondary refuse in the abandonment/post-abandonment period (Rothschild *et al.* 1993, table 10.1). Considering the limited survival of organic remains in the archaeological record, it is possible that even this slight increase in foodstuffs might be consistent with the suggestion that 'occupation soil' is in fact rotted down abandonment/post-abandonment refuse²⁵. This is confirmed by the relatively high proportion of potsherds (Appendix 4.8; cf. Lightfoot 1993, 170). It might also be supported by the fact that occupation soil has the least proportion of fixtures and fittings – particularly if 'holed stones' can be seen as thatch weights – perhaps revealing that it formed *above* a derelict horizontal interface.

8.2.3 Salvaging

The deliberate removal of timbers was commented on at Chester House CS 1, Northumberland (Holbrook 1988, 55). At Lintshie Gutter Plat 8, Ph 2 (Lanarkshire) the widening of the wall-slot and an upper fill of larger stones were taken to suggest that the wall timbers had been removed after abandonment (Terry 1995a, 389-90). At Lephinchapel South (Argyll & Bute), structural postholes had been backfilled with stones and soil (Rennie 1997, 155) and at St. Germain's Ph. 3 (East Lothian) the wall-slot fill was of redeposited natural (Watkins 1982, 110). Reynolds (1993) has suggested, however, that such activity could also be seen as measures taken to counteract weaknesses brought about by post-end decay: the deliberate filling of the decay cavity to prevent lateral movement of the post. The best evidence, however, comes from Thorpe Thewkes (Cleveland) where CS I was 'systematically dismantled' prior to rebuilding. Heslop argues that the dark, silty fill of the second phase features should have captured timber impressions; and that their lack suggests that the posts had again been removed (Heslop 1987, 15; 23). In the third phase, after an initial fire, the structure was dismantled to salvage the larger timbers, after which the unusable elements, including the thatch, were burnt to clear the site for a further phase of rebuilding (*ibid*, 36).

²⁵ This conclusion was also reached regarding such deposits at the well-preserved structures at Qasr Ibrim in Nubia (Rowley-Conwy 1994).

Where the record is less forthcoming, it is usually assumed that enlarged postholes are a clear sign of salvage activity. This occurs when the post has been dug out, creating a post-extraction pit. One in six timber-built structures had features more than 50% wider than the prehistoric average (0.32 m). Another indicator is the oval shape of some enlarged postholes, which is created by the rocking motion used to loosen the post. However the work of Reynolds (1993) has shown that both enlarged and oval postholes are more likely to be evidence for repair than for salvage activities. At the *Pimperne House* wood decay in the porch posts led to the undertaking of post replacement. During this process the rotted base of one of the posts broke off from the rest of the post and had to be dug out (Reynolds 1993, 102). During a further post replacement it was found that the release of the decayed post was made easier by digging into the side of the posthole and sliding the post out (*ibid*). Both of these processes cause damage to the original cut and this evidence could be mistaken for salvaging activity.

At Assendelvers Polders in the Netherlands, the survival of wood chips on the final phase floor revealed that at least some of the roof supports had been chopped off at ground level for salvage (Therkorn *et al.* 1984, 363) - giving the impression, under normal archaeological survival, that the posts had actually decayed *in situ*. From the Assendelvers Polders evidence it becomes clear that a salvage team would not spend time digging out posts which had suffered post-end decay, a process which begins to occur in just a few years. Identifying salvaging activity in the archaeological record is therefore fraught with difficulty. It is suggested that the salvage of all but the largest rafters was uncommon because of the difficulty of working dead wood and the importance of accurate jointing in roundhouse construction. Equally insecure is the evidence for the re-use of stone. One in three stone-built structures showed evidence for the salvage of stone. However much of this may be accounted for by the *later* robbing of stone for use in modern structures and field walls (e.g. Jobey & Jobey 1988; Jobey 1973a).

At Newmill CS 1 (Perthshire), none of the central-ring postholes had a disturbed packing and the posts had apparently been left to rot *in situ*, a view supported by the 'fine, unadulterated soft soil which filled the cavities left by the posts' (Watkins 1978-80b, 184). Watkins suggests that if the posts had been withdrawn, the sides of the postholes would show evidence for collapse and their fill would have been of occupation debris (*ibid*). At Port Seton (East Lothian), the intact packing of post holes showed that posts had rotted *in situ* (Adams *et al.* 1996, 50). At Ballacagen A Ph. III CS A too, the posts had decayed *in situ* to a soft brown powder (Bersu 1977, 21). Post-pipes were recorded in sixty-one timber-built structures and the vast majority of these were recorded in central-ring postholes. One in three structures where feature fill was recorded – only 11% of suitable structures - had a brown loam or silty fill, which might also indicate that in these structures the wood had decayed *in situ*.

Of 256 structures where packing was recorded in negative features²⁶, there were only four instances where packing stones were recorded as being displaced and only at two sites were they specifically recorded as being *in situ*. Such details should be recorded as standard. Perhaps *in situ* packing is seen as being unworthy of additional comment in the recording process and only displacement would force such detail. It is suggested, that those *without* detailed comment may represent *in situ* packing stones, this can apparently be confirmed by a review of the published plans. If this is the case, then the record may represent a situation where, on the whole, structures were allowed to decay with their posts *in situ*. Unfortunately, the poor quality of this particular type of evidence means that the result can not be conclusive.

It has been suggested that another element open to salvage was a structure's roof (A. Crone pers. comm.) and indeed the rafters from the Reynold's *Pimperne House* were salvaged for use in the *Longbridge Deverill Cow Down House* (Reynolds 1993, 109). Evidence for this was found at Cùl a'Bhaile in Argyll (Stevenson 1984, 157) and also at Culhawk Hill in Angus (Rees 1998, 125). At Culhawk Hill, the ring-ditch fill sequence shows that basal fills of slow-forming organic soils were covered by in-wash from the eroding topsoil. This would suggest that, unlike the timber uprights which were apparently allowed to degrade *in situ*, the roof was probably removed upon abandonment (*ibid*). At Carn Dubh CS 5 (Perthshire), the upper fill of the wear gully in the inner-zone trapped a deposit of larger pieces of roundwood charcoal that was radially aligned on the centre of the house, appearing to represent roof timbers (Rideout 1995, 164). The excavator suggests, however, that - because of the restricted nature of the deposit and because the wood is of small diameter - much of the superstructure had been removed before the burning episode (*ibid*, 167). Here perhaps only the larger roof timbers had been salvaged.

8.2.4 Destruction by Fire

The burning down of a structure may have been accidental; it may have been a deliberate act on abandonment for sanitary reasons - to rid an area of rats or fleas before a new house is constructed nearby (Bersu 1977, 59); it may have been undertaken as part of an abandonment ritual (Brooks 1993, 180); or may be evidence for prehistoric arson. Evidence for conflagration events in the circular structures of north and central Britain is slight: only thirty-nine structures had suffered such an event. Of those destroyed by fire one in three was rebuilt. A high proportion (27% more than the norm) of circular structures destroyed by fire were apparently domestic structures. There was no trend according to date or region. There was also no trend regarding the provision of a hearth or of hearth position. The only trends which were noted were the 10% increased chance of fire if the structure were sub-circular in shape and the increased

²⁶ Such a low number reveals that rather than stone packing being necessary for structure stability, it was simply a resource utilised in stone-rich areas.

risk of fire in structures composed of spaced posts than in contiguous-walled ones. It has been suggested that the latter might provide greater ventilation potential and therefore an increase of successful fires in this type of structure (Karl Harrison pers. comm.). McCullagh & Tipping (1998) have suggested that the Lairg fires were accidental and the above evidence might be consistent with this.

At South Shields, however, there is a reasonably convincing argument – in the nature and positioning of artefacts - for the deliberate burning of the structure on abandonment (contra Hodgson *et al.* 2001). The position of a cattle tooth against the wall, diametrically opposite the entrance; quern fragments in the hearth; and the possible deposition of an unknown object of copper alloy do have much in common with abandonment traditions identified more generally, whilst the basket of clean grain in the doorway would not be seen under normal conditions of archaeological survival. It was assumed that the best information regarding the nature of conflagration events could be retrieved when more than one structure had been destroyed by fire at the same site. If post-conflagration practices are consistent at these sites, perhaps there is a reasonable argument for the identification of cultural traditions. Only at Thorpe Thewles, Cleveland (Heslop 1987) did post-conflagration practices differ. As usual, dating evidence is less than ideal, however there is the suggestion that these two structures may have been separated by around a century. Where structures are more securely contemporary post-conflagration practices are found to be consistent on any one site (table 8.3).

Site	Region	No.	Pd.	Result	Reference
Lintshie Gutter	Irish Sea	2	LrNeo	Both rebuilt	Terry 1995a
Lairg	Highland	2	E-MBA	Both rebuilt	McCullagh & Tipping 1998
Green Knowe	North Sea	2	MBA	Both abandoned	Jobey 1978-80
Breiddin	N. Wales	2	EIA	Both abandoned	O'Neil 1937
Dod, The	North Sea	3	LrIA	All rebuilt	Smith & Taylor 2000
Romancamp Gate	Highland	2	LrIA	Both abandoned	Barclay 1993
Thorpe Thewles	North Sea	2	LrIA	One abandoned; one rebuilt	Heslop 1987

Table 8.3 Treatment of burnt down structures

Evidence from north and central Britain seems to suggest that those circular structures which were destroyed by fire were mostly domestic in nature. It is also suggested that such fires were, on the whole, accidental (contra Brück 1999b)²⁷ – unlike the evidence for the deliberate burning of houses of the middle-late Neolithic Vinča culture of south-east Europe (Stevanović 1997). Conflagration events were relatively rare; although Gerritsen (2001) has recently questioned the reliability of the evidence when we consider that posts below ground level would not be burned due to a lack of oxygen. Conflagration at the first *Glastonbury House*, for example, left the central-ring posts burnt only at their top half (Reynolds 1967, 8). The research of Karl Harrison

²⁷ The same conclusion has been reached by Leo Webley (forthcoming) regarding houses in LrIA Denmark, where conflagration events are far more common than in Britain.

- currently in progress at the University of Reading - is hoping to isolate more information regarding burning events in prehistoric structures, such work may lead us to a more complete understanding of practices associated with conflagration episodes. The consistency of post-conflagration practices at particular sites does reveal, however, that the decision to rebuild or to abandon was a cultural one and was site-specific.

8.2.5 Post-Abandonment

Where recorded, the collapse of stone walls seems to have been allowed to occur naturally, creating a spread of material to either side of the wall, between 4 and 5 m wide (Kilbride-Jones 1938, 318; Griffiths 1959b, 124). If the iron nails found on the floors of a number of RIA structures in Northumberland are evidence for the nature of the roof joints in the early centuries of the 1st millennium AD this might reveal that these roofs were allowed to decay *in situ*. There appears, however, to be a distinct lack of evidence for decayed thatch deposits. This lack might indicate the effects of bird activity and animal grazing upon collapse. Possible roof deposits were recorded at Braich y Cornel B1, Conwy (Gresham 1972) and Standrop Rigg, Northumberland (Jobey 1983). At Conway Mountain CS 1 (Gwynedd), an inverted saddle quern lay c. 6 cm above the floor on a clean loamy soil which the excavators interpreted as decayed roof material. Likewise in CS 3, two saddle querns were found inverted above a similar deposit (Griffiths & Hogg 1956). A functionalist interpretation sees the querns as having been kept on the roof, presumably as thatch weights, and falling into their archaeological position on collapse. It is also possible that the querns were a ritual deposition accompanying or after collapse.

A photographic study was undertaken at Bowburn, Co. Durham between December 1999 and June 2001 regarding deposit formation on the site of a collapsed shed. During the period of the study a total of six major processes were recorded: salvage episodes; a conflagration event; deposit formation; a dumping episode and second conflagration event; deposit formation and vegetation growth; and finally a clearance episode and site regeneration (fig. 8.4). The composition of the deposit changed dramatically during the first four months after collapse, following initial salvaging activity and continued small-scale waste disposal. The human-led processes of salvaging, trampling, arson, child's play, dumping and waste disposal were recognised as having a major altering effect on the nature of the deposit, *alongside* the natural processes of erosion and vegetation growth. To these might be added the additional factor of animal grazing in a rural environment.

The Bowburn study revealed how a collapsed structure has a visual impact on the landscape and how it almost seems to demand human interaction, becoming in effect an 'activity trap'. It wasn't

until eight months after collapse (August) that vegetation growth was sufficient to protect the deposit and allow it to develop 'naturally'. At Llwyn-du Bach, Bersu suggested that, after abandonment, layers of debris and organic material had been lost to wind erosion until a protective layer of vegetation had formed (Bersu & Griffiths 1948-49, 195). In the Bowburn study, water action was seen to have a major degrading effect eight months after collapse. Obvious too was the role of floral interaction in soil formation after just sixteen months. It is perhaps in these three major processes – abandonment/post-abandonment refuse disposal, water action, and floral interaction - that we can envisage the formation of what we call 'occupation soil'.

Turning to the evidence from the contextual analysis of finds from post-abandonment contexts (fig. 8.3). Most significantly, decay deposits are the only type of deposit found to have a category other than food preparation finds as their main constituent. For this deposit type finds linked to food preparation were least represented. Instead, 47% of finds in decay deposits - 16% above the average - were from the 'craftworking' category. Looking at the data in Appendix 3, the objects concerned are arrowheads, loomweights and spindlewhorls, and cannel coal-working debris; each of which occurs 8% more than the average. Returning to fig. 8.3, as might be expected, decay deposits have 5% less than the average representation of foodstuffs and a 12% drop in the proportion of potsherds. These figures reveal the lowered impact of the domestic routine on their formation. They also have a 5% less than average occurrence of personal artefacts, such as jewellery, and they have a complete lack of display artefacts, such as coins or weapons.

At Broxmouth CS 4 (East Lothian), after three rebuilds the drystone walling of the final phase collapsed inwards and the hollow of the scoop filled up with a dark loam containing large quantities of bone and marine shell (Hill 1982b, 32). At Broxmouth too, the remains of the northerly structures were covered with a deep series of midden deposits (*ibid*, 34). At a few other sites, sherds of pottery have been found above occupation deposits, for example at the Breiddin R1 (Powys), Bush Farm B (Gwynedd), the Dod AVI (Scottish Borders), and Hetha Burn 1 CS A (Northumberland). At the latter two sites, sherds of Roman period glass also came from the post-abandonment levels. It appears that at sites like these the site of a decaying house did become a focus for later waste disposal as evidenced in the Bowburn study.

At other structures, however, cultivation succeeded habitation. At Ironshill CS 2 (Angus), for example, the site was ploughed over shortly after abandonment a cultivation soil developed (Pollock 1997, 348). The same was found to be true at Lairg CS 2, Highland (McCullagh & Tipping 1998, 39). At Thorpe Thewlcs CSJ (Cleveland) mixed post-abandonment layers may have been produced by 'the puddling effect of animal trample' (Heslop 1987, 29) as the site was

no longer guarded from animals, whether domestic or wild. At Standrop Rigg (Northumberland), clearance material had been deposited around the timber-built structures, presumably - at least partly - a post-abandonment activity as the material obscured the structure entrances (Jobey 1983, 10). This mirrors the smaller-scale processes witnessed in the first few months of the Bowburn study as the site became the focus for small-scale 'clearance' deposits from the surrounding land. Some sites were re-occupied centuries after final abandonment (cf. Rennie 1997, 155; Kelly 1988b, 58).

8.4 Discussion

Using criteria set out by Stevenson (1982), Brooks (1993), and Lightfoot (1993) we can suggest that the vast majority of prehistoric abandonment was planned, as the ethnographic literature suggests might be the case (Cameron 1991, 4). Prehistoric circular structures have limited primary refuse and an abundance of abandonment refuse. Assemblages have little evidence for refit sequences and few large items of *de facto* refuse – even when a rotary quernstone remains *in situ* its upper stone rarely accompanies it. This suggests that the abandonment of prehistoric circular structures was, as might be expected archaeologically, permanent. However this does not preclude the existence of episodes of abandonment prior to the terminal event: the one that archaeology sees. We can also suggest - because of the high proportion of structures without finds and again because of the nature of our *de facto* refuse - that the distance between the abandoned structure and its new counterpart was generally limited. This implies that the new house is constructed either elsewhere on the same settlement site or at a different location within the same landscape.

There are three main types of finds in (potential) abandonment contexts in the circular structures of north and central Britain (see fig. 8.3). The majority of finds are those to do with food and food processing; a close second are the tools and debris from craftworking activities; the third category can be described as 'personal' finds and those of value: jewellery, clothes fasteners, etc. It can be argued that between them these reveal the two major processes at work on the abandonment of prehistoric structures: the deposition of abandonment refuse, and the deposition of finds in the form of 'closing deposits'.

The contexts most securely attributable to abandonment are hearths and floors. Deposits on the floors consist mainly of what can be considered personal finds: those of personal value, in particular metalwork, but also games and curios, hones, jewellery, and fineware. In hearths too, the deposition tends to be of personal finds: in particular display metalwork. Finds in non-structural feature fills might also be attributable to abandonment. Pits associated with houses reveal evidence for what might be structured deposition with the deposition of plant remains,

quernstones, and fineware. Drainage-gullies reveal a tendency for having quernstones and metalworking debris deposited in them. Having accepted that domestic finds assemblages are usually the result of abandonment processes and that many finds signal ritual deposition during the lifetime of the house, the chronological and regional variation of finds context was plotted in order to help identify trends in ritual tradition (figs 8.5-8.8). Both formation context and spatial context were analysed. The results were cross-checked with information from Appendix 4.

Chronologically, the results indicate that constructed deposits may have had their origins in the EBA and were certainly popular by the MBA. The practice became less popular, certainly by the EIA but increased again during the later 1st millennium BC becoming especially common in the RIA. Deposition in pits seems to have EBA origins with a flourish in the early 1st millennium BC but becoming increasingly unpopular towards the end of the later 1st millennium BC. Deposition in drainage-gully terminals seems to have originated in the MBA, with a flourish in the LrIA and becoming increasingly unpopular during the 1st millennium AD. Deposition on the floor again seems to have at least MBA origins continuing throughout prehistory but becoming particularly popular in the RIA. Deposition in hearths seems to have been relatively rare but currently seems to have had its origins in the LBA and, although the evidence is limited, the practice does seem to have continued throughout prehistory. Deposition in the abandonment period seems again to have MBA origins, continuing throughout prehistory. Deposition in the post-abandonment period seems to have strong origins in the EIA period after which it was a minority practice.

Regionally, constructed deposits seem to be popular in all regions – particularly in the North Sea region - but with deposits more likely to be placed in feature fills in the Midland Plain and Yorkshire Pennines regions, where use of stone is less common. Deposition in pits and on the floor is also least popular in these regions; deposition in drainage gullies more so, particularly in the terminals. Also in the Midland Plain and Yorkshire Pennines regions, finds are more likely to be deposited in external contexts. Deposition on the floor is particularly popular in the North Sea region; deposition in the hearth more common in the Irish Sea region. Deposition in occupation soil seems to be more common in the west whilst deposition in the post-abandonment period seems to be fairly peculiar to north Wales.

As well as evidence for ritual deposition, this work has also revealed evidence regarding some of the routines surrounding craftworking activity. For example, whilst the debris of cannel coal-working was associated with the hearth, smelting debris was not, suggesting that the two activities took place in different locations. Evidence was also found regarding waste disposal practices associated with craftworking. Occupation soil - which, it has been argued - is dominated by the deposition of abandonment/post-abandonment refuse has an above average

occurrence of VCP and shell, as well as craftworking debris. One can envisage how an abandoned structure – in a still-occupied settlement – might become an acceptable place, and a focus, for particular types of waste at some sites in the post-abandonment period. This might be tied in with the below average occurrence of craft-working debris on structure floors.

Destruction by fire was not a dominant cultural practice in the prehistory of north and central Britain and it seems safe to conclude that the majority of structures were left to decay naturally after abandonment. However the lateral displacement of LrIA-RIA door pivotstones – identified at Bonchester Hill, Harehope, Huckhoe, Milking Gap, and Tower Knowe in the North Sea region, as well as Percy Rigg in Yorkshire – is interesting and may suggest a tradition of removing the door on abandonment in this region: perhaps for re-use in the new house or to signal site abandonment to others. Decays deposits were found to contain an above average proportion of finds associated with textile production as well as cannel coal-working debris, and arrowheads. It was found that along with abandonment and post-abandonment behaviour, the natural processes of water action and floral interaction have the greatest impact on the formation of archaeological deposits in the post-abandonment period. It is in this context that we can envisage the formation of 'occupation soil'.

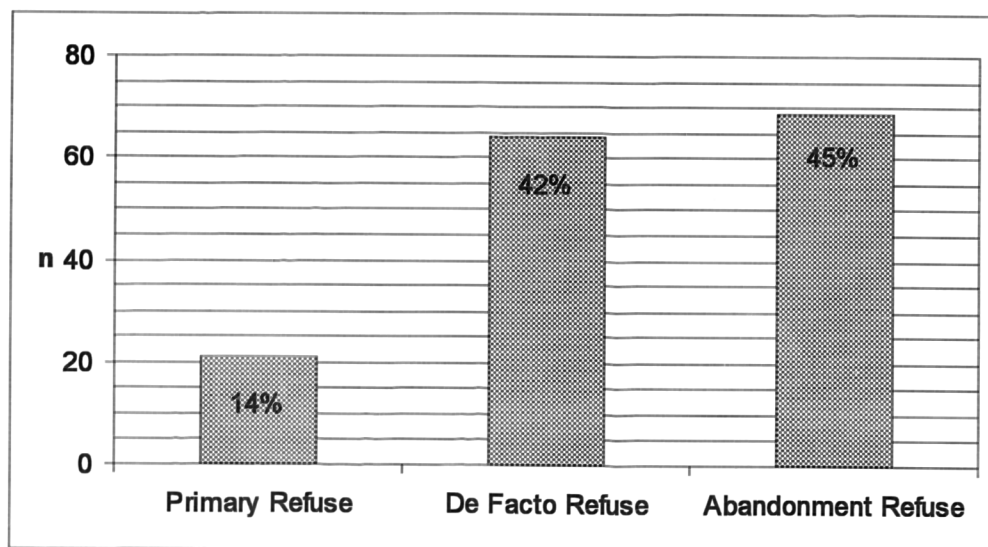


Fig 8.1 Characterisation of prehistoric floor assemblages

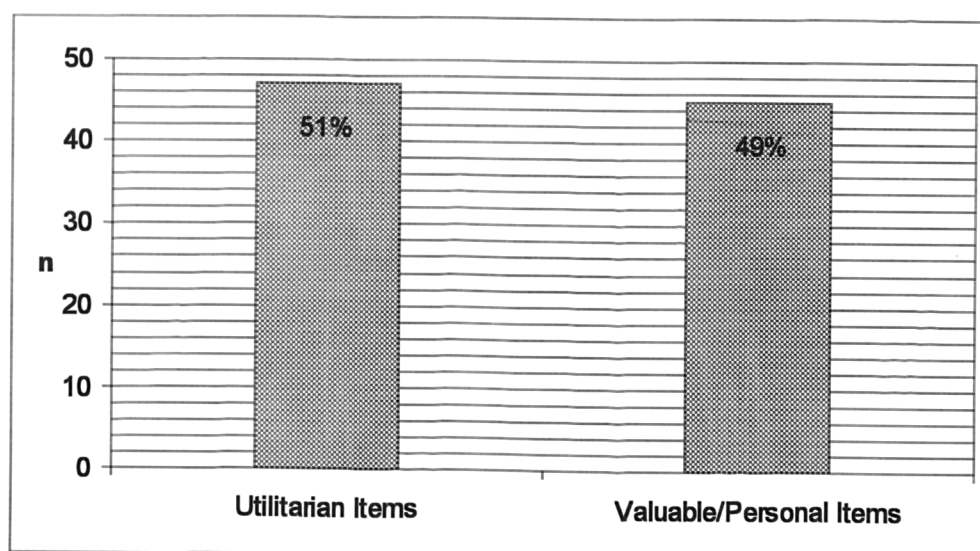


Fig 8.2 The proportion of utilitarian and valuable/personal finds on floors

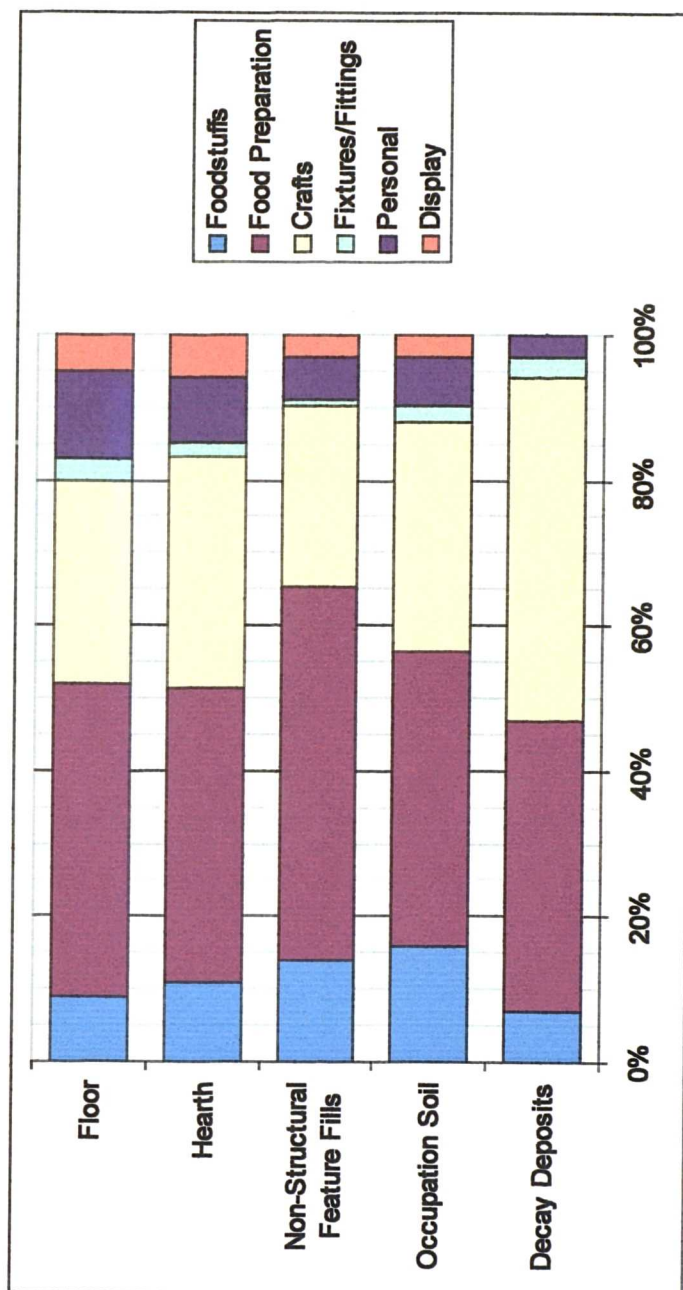


Fig 8.3 Finds type and context



Fig 8.4 Main changes in the composition of the Bowburn Study deposit

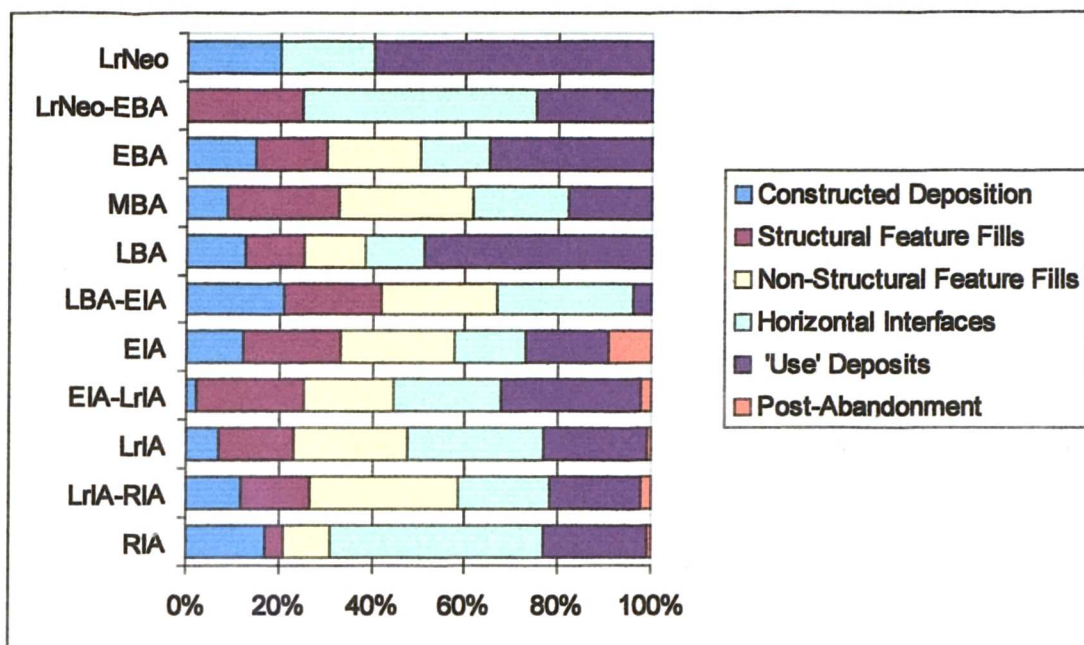


Fig 8.5 Chronological variation in finds context: formation

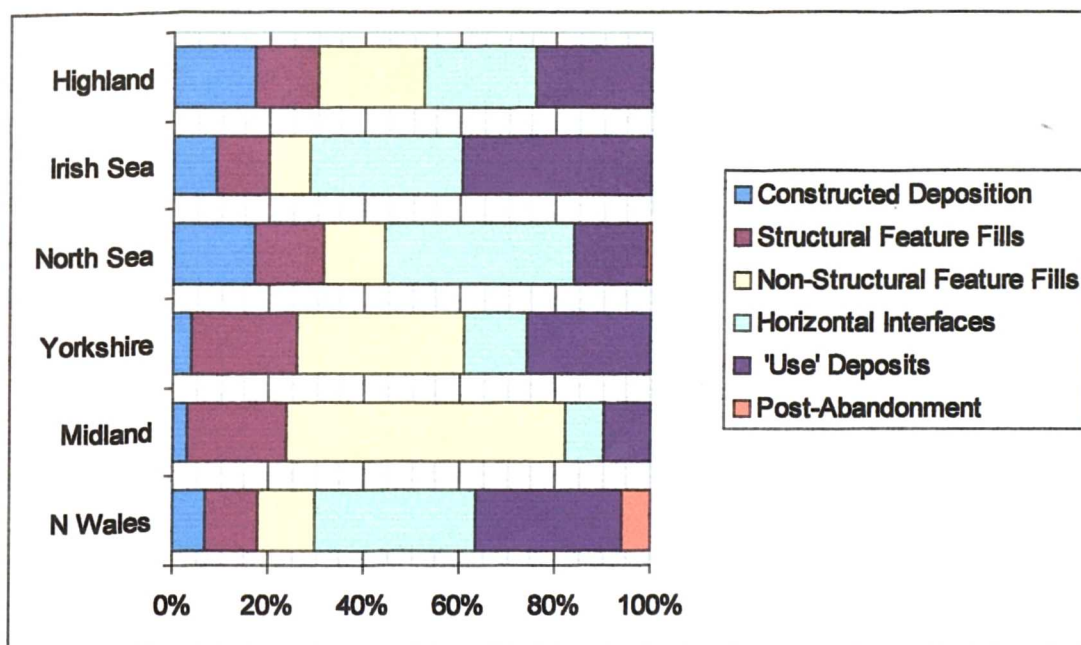


Fig 8.6 Regional variation in finds context: formation

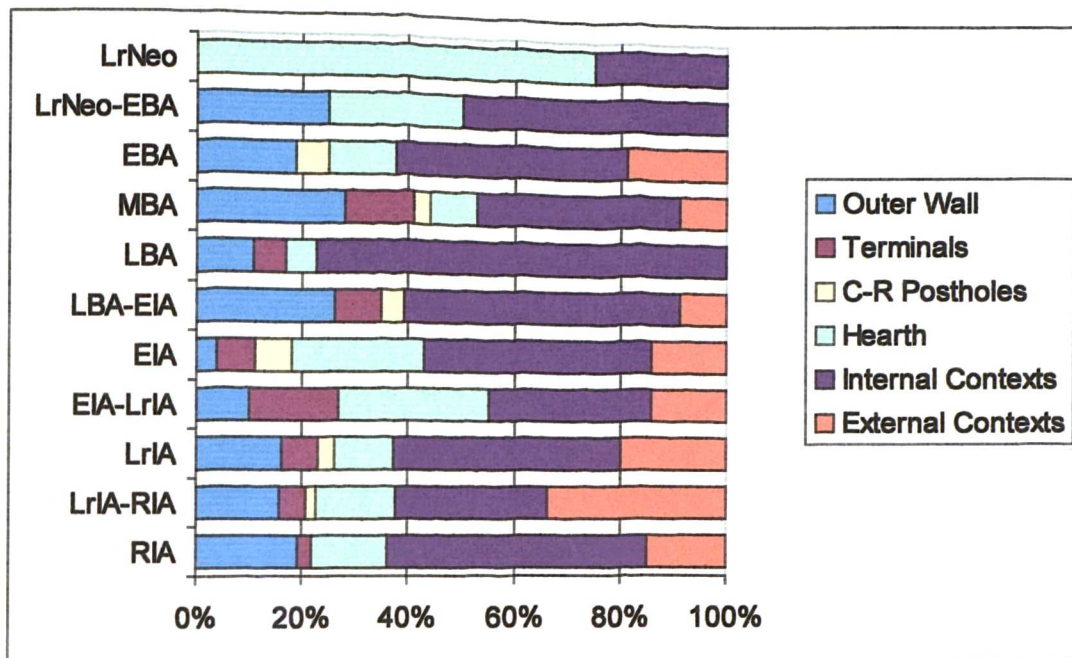


Fig 8.7 Chronological variation in finds context: spatial

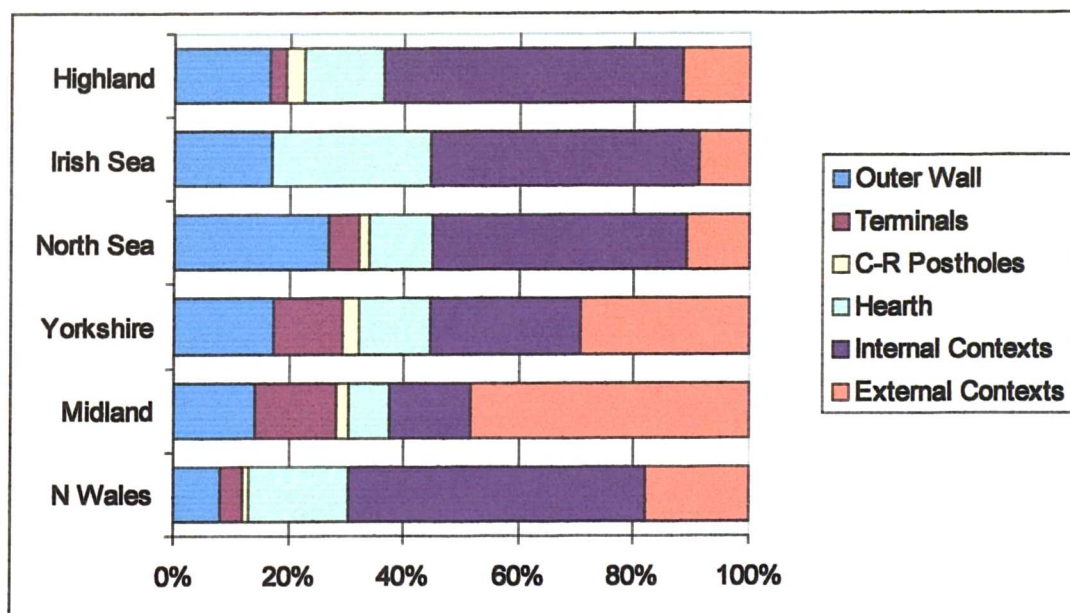


Fig 8.8 Regional variation in finds context: spatial

Chapter 9 Discussion

"Fiction must stick to facts, and the truer the facts the better the fiction"

(Virginia Woolf 1929)

9.1 Introduction

This chapter brings together all of the various strands of evidence from the preceding chapters. The first section discusses the roundhouse as a general phenomenon. It presents a summary of the main trends found in the analysis of the architectural dataset, including the construction process, ritual deposition, structural engineering, house types, location, land-use and economy, structure function, use of space, lifespans, maintenance, abandonment and decay. The second section brings together the evidence for regional variation from the norm and seeks to characterise different regions: how the various regional communities developed, how their social systems varied, and how they interacted with each other. The third section draws together the information for variation through time. The final section summarises conclusions drawn from the architectural evidence regarding an understanding of social change in the later prehistory of north and central Britain.

9.2 The Roundhouse: A Narrative

One of the major technological achievements in human history was the development - in the 3rd millennium BC - of the ring-beam: providing prehistoric communities with more domestic space and the potential for the greater longevity of settlement in the landscape. Circular walled architecture lasted in Britain for a maximum of three millennia, surviving longest it seems in north Wales. Major woodland clearance in the later 1st millennium BC, however meant that by the end of the Iron Age timber resources had decreased. The immediate reaction to this in the domestic sphere is the greater use of stone. Circular drystone structures, however, again put a limit on the use of domestic space. As a result, a new phase of innovation saw the acceptance of new architectural forms. In Atlantic Scotland, communities tackled the problems of limited size by building more *substantial* stone structures: duns, brochs and wheelhouses. Elsewhere, communities accepted the rectilinear form: a type more suited to drystone construction and capable of providing greater domestic space. Fig. 9.1 is a development of the work of Innocent (1916) and Walton (1952) and provides a typology of prehistoric architectural forms. See also 4.2.2 and fig 4.5.

In prehistory, architectural knowledge was held jointly by the community and was passed down to younger generations during their active involvement in the construction process. Structure design was adapted to suit the type of materials and facilities available in the local area, resulting in a high degree of local variation. The latter might also reveal the inter-connected nature of communities across the landscape with a resulting fluidity in structure design. The best time for construction was in midsummer, a time when labour could also be requested from other households in the wider landscape. House construction - a social occasion and a chance to educate the young in the traditions and practice of construction - was engaged in by men, women and children alike and probably took no longer than a week in total. During most of this time stored materials were transported, additional materials were gathered, and the site was prepared. These activities culminated in building and thatching the structure which probably took as little as a day. The vast majority of circular structures are between 4 m and 14 m in diameter, although they can be as small as 2 m and as large as 19 m. Structure size varies according to function and household size but the average is 7.9 m. If each person requires a space 1 m x 2 m, the average structure would sleep between 12-20 people comfortably in the rear third of the structure (either at ground level or in the attic).

Ritual deposition prior to or during construction exists but is not common. Traditions identified usually include the deposition of quernstones in structural features, drainage-gullies terminals and within stone walls. Less often other stone artefacts – those arguably reminiscent of the quern – are used in these practices. Alternatively, items of prestige metalwork are constructed into the wall. A less common practice is the deposition of a tool used in house construction. These practices are predominantly LrIA-RIA in date²⁸ but appear to have their origins in the 2nd millennium BC. The fact that so few structures reveal these deposits suggests that they were only made in certain structures and under certain circumstances, for example, when a household is established in new lands. Deposition in pits also involves the deposition of grain and fineware which might represent the remains of communal feasting during construction. Deposition in drainage-gullies also involves metalworking debris. More rare is the provision of re-use deposits – essentially foundation deposits for a new phase in the structures life-history. Most common is the inversion of a quernstone. This is particularly found as part of the infill of the wear gully in ring-ditch structures and it is possible that the deposit denotes a change in the function of the structure, perhaps as a result of decline in household economy, for example as a result of the moving away of adult children.

The structure type best adapted to the technology and environmental conditions of later prehistory is the cone-and-cylinder, with walls and a conical thatched roof pitched at between 45-55°. Only one in three circular structures is truly circular, most can be described as sub-

²⁸ Data biases have been taken into account by the author throughout the discussion.

circular and a high proportion are more oval in shape. The latter tending to be earlier. The main structural systems employed in prehistoric circular architecture are those of timber sinking, followed by the weaker technique of mass walling. Both types employ ring-beam technology. In most structures the weight of the roof rests on the *wall-plate* of the outer wall, although a high proportion employ another *main ring-beam* raised on an internal post-ring. The latter becomes structurally necessary with a *c.* 10 m diameter. A post-ring works as scaffolding during construction: serving to raise the main ring-beam as a prop for the principal rafters. The post-ring is structurally defunct following construction however the identification of the prehistoric practice of *overbuilding* - which sees structures with a diameter of a little as 7 m with an internal post-ring - reveals their additional use as a basis for an upper floor. Only very few structures have a second internal post-ring. The majority of post-rings employ radial or axial symmetry which reveals techniques used in the laying out process. Structures had a wide entrance with double doors. Most have a doorway high enough to prevent stooping on entering.

Wattle and daub walls are very uncommon in north and central Britain - not least because of the labour intensive nature of daubing, particularly on non-clay subsoils. The use of timber was more common so that we can confidently envisage areas of (communal) managed timber woodland. Oak was the main structural timber in most of north and central Britain with hazel - presumably coppiced for wood - the next most common type. Birch and alder were used in the north-west where oak was absent. The average-sized structure with contiguous timber walls would require material from *c.* 37 trees. Stone is used in its natural form and is obtained by digging into the hillside, whilst turf becomes available during the de-turfing of the house site. It is likely that reed was commonly used for thatching and became a managed resource in the landscape. Most structures serving as the main residence have contiguous timber walls set in a wall-slot - the strongest and on average slightly larger form, others have walls of spaced load-bearing posts and turf infill. In north and west Scotland - and by the LtIA-RIA period elsewhere - drystone walling was more commonly used and these weaker structures tend to be slightly smaller. Seasonal or short-term structures might also use the above types but a more exclusively seasonal form exists in the ring-bank. Usually of turf, some with stone foundations, these employ the mass wall method and many have internal wattle-lining.

The majority of structures are located on a hillslope, with most on the moderate slopes at or below 200 m. This position is in close proximity to areas of slope cultivation and offers ease of access to a variety of land types whilst avoiding the flood plain. Most structures are oriented to maximise light and shelter and slightly less than half of structures have an orientation which optimises shelter and light in the winter months. These are most likely to represent the main residence. Slightly more than half of structures are apparently seasonal and are more likely to be found at over 200 m. One in four structures occupy a summit or ridge location whilst just one in

ten structures are located in the valley. The latter tend to be much larger structures. Most members of a household occupy the main residence on the moderate slopes from late autumn to early spring whilst overwintering their livestock. In late spring more of the landscape begins to be utilised until by early summer much of the household – perhaps with their flocks - have joined members of other households from the wider landscape in a large upland enclosure. It is here that craftworking and socialising takes place as members of this wider community pool resources and reside in seasonal structures. In late summer many retreat to their main residence to take part in the harvest. Storage of grain tends to take place at higher levels and might be seen as an increasingly communal resource. In autumn, the household spends more time in the lowlands gathering and preparing food for the winter months.

Settlement enclosure is seen as being linked to the practice of mixed farming. Orientation of enclosures – both simple and elaborate forms - tends to focus on sunrise at different times of the year in different areas. More consistent is orientation, towards south-west (winter sunset) and this might be interpreted as displaying phenomenological or ritual concerns. The stalling of cattle within the house is revealed by the large ring-ditch structures of north-east Britain. A number of structures – predominantly in western Britain, particularly northern Wales - are provided with an internal drain and these smaller structures may be associated with sheep farming. The existence of wear – which is potentially indicative of animal traffic - is also present at a number of structures. In all, perhaps one in ten structures reveal evidence for use as byre-dwellings or as separate byres. Only one in four structures reveals a non-domestic function and these may be evidence for their use as seasonal or ancillary structures. Craftworking, including metalworking, is most likely to take place in an ageing structure. Grain storage only rarely takes place in a circular ancillary structure and is more commonly found within the main domestic structure - where it is also prepared - and externally in pits and four-posters.

Use of space was not culturally prescribed and was relatively variable, despite a trend towards certain activities taking place in those areas with most light. The hearth – most commonly in the form of a slab setting, pit-hearth, or hearth stones – is generally positioned centrally to ensure even distribution of heat and light. One in six structures have an external hearth – an indicator of seasonal use. The main fuel type was firewood, predominantly hazel and birch, rarely oak. Roughly two in five structures have no evidence for a hearth and whilst in some the hearthstones may have been removed, we might also see this as evidence for their seasonal or ancillary nature. Most floors were of wood. Most structures reveal an annular division of space, however front-rear division of space was also common. Both are largely influenced by the provision of light within the structure. Most structures in excess of 7 m in diameter made use of an attic/loft as revealed by the prehistoric practice of *overbuilding*. Beds – straw and heather confined by lengths of timber - were positioned at the rear of the structure – around the

periphery - or in the attic. In double-ring structures the periphery is on average slightly wider than the structural norm which may reveal the need for a set width, either for beds or animal stalls. Use of external space was common and a high proportion of structures reveal evidence for features associated with agricultural production. The majority, however, are not directly linked to agricultural production and this presumably represents the high proportion of seasonal structures in the record.

Main residence structures had a potential lifespan of around 60 years but the majority of structures were abandoned after perhaps as little as a generation. Where repair activity exists it is not excessive and is more frequently associated with seasonal structures because of their shorter lifespans and limited occupancy. Some structures were rebuilt – the majority only once - and some sites may then have been occupied for two or more generations. Unrepaired older structures were more likely to be used as ancillary structures involved in craft production. Structures were generally kept clean except prior to abandonment, when refuse was allowed to accumulate. The process of abandonment was planned and permanent, and distance to the new structure was limited, perhaps to elsewhere on the same site or a shift to a new stretch of landscape. Occasionally on abandonment, personal and prestige items were deposited on the floor – often at the very rear of the structure diametrically opposite the entrance – less commonly deposits were left in the hearth. Where timber salvage did take place it is suggested that only the larger timbers in the roof may have been removed but salvage of stone was more common. There is evidence that at some later sites the door was removed on abandonment perhaps for re-use in the new structure or to signal site abandonment to others. At present it seems that most destruction by fire was accidental and it appears that the majority of structures were allowed to decay and collapse naturally. Abandoned structures often became the focus for waste disposal. Very rare indicators of ritual deposition in the post-abandonment period reveal deposition of quernstones, artefacts associated with textile manufacture and arrowheads.

9.3 Regional Variation

Fig. 9.2 reveals those characteristics which are unique to each region. Many of these factors may be seen as having environmental rather than cultural origins and figs 9.3-9.4 show modern regional variation in weather patterns and optimised land-use for comparison. Fig. 9.5 reveals those features shared with other regions and table 9.1 summarises these similarities, thereby revealing the potential links between regions as well as revealing which regions appear to be more insular. Figs 9.6-9.7 reveal regional and chronological trends in the dominant type and size of circular structures. Fig. 9.8 brings all of the information together in a character sketch of each region with suggestions regarding social systems, systems of land-use and economy, and

ritual traditions. It must be remembered that these characterisations are based only on evidence from the domestic sphere. The following sections discuss the findings in more detail.

	Highland Scotland	Irish Sea	North Sea	Yorkshire Pennines	Midland Plain	North Wales	TOTAL
Highland Scotland	-	13	9	5	0	5	32
Irish Sea		-	11	1	0	5	29
North Sea			-	1	0	7	28
Yorkshire Pennines				-	15	0	22
Midland Plain					-	0	15
North Wales						-	17

Table 9.1 Summary table revealing links between regions

9.3.1 Northern Britain

Highland Scotland, the Irish Sea and North Sea regions have a number of features in common. All three regions share trends in settlement location, the greater use of lofts and of post-ring symmetry, as well as in floor and hearth types. Ritual traditions are similar, in that constructed deposits are more popular in these regions. In addition, structure orientation is more likely to be southerly but this is presumably a more environmental factor and linked to the need for maximising light during the shorter winter days in the north. In the east, Highland Scotland and the North Sea region share a high proportion of ring-bank and ring-ditch structures, revealing seasonal land-use and cattle-based pastoralism to be important elements in the subsistence economy of each region. The latter may be linked to the early origins of enclosure in these regions. In the west, Highland Scotland and the Irish Sea region share other qualities, for example more structures are oval in shape (an earlier form) and there is more rebuilding activity which implies a greater degree of sedentism. There are no clear similarities between the regions of northern Britain and that of the Midland Plain although there are some similarities with the Yorkshire Pennines and even more with north Wales. The communities in northern Britain can on the whole be seen as very fluid in nature. All have more rebuilding activity than regions further south which may reveal the existence of greater sedentism and perhaps of lineage systems in these regions.

Highland Scotland²⁹ is the region which seems to be perhaps the most culturally distinct of the three – although the Irish Sea region is a close second - it is possible then that the communities in the north and west have earlier origins. This is borne out by the fact that most of the earliest walled circular architecture can be found here such as the LrNeo sites of Auchategan (Argyll)

and Greenbogs (Aberdeen). Post-built structures are dominant. There is more unenclosed settlement here than elsewhere and a greater number of ring-banks suggesting that seasonal land-use was popular, a fact confirmed by the greater degree of repair activity. Communities were less likely to utilise the higher ground here than in other regions and this may be a result of the poorer climate. The impact of less-favourable weather is seen in other ways such as the greater provision of hearths and porches and the use of narrower doors. However many factors are not weather-related such as the popularity of dual flooring and the provision of more peripheral space, both of which point to the role of cattle in the subsistence economy. Similarities with the Yorkshire Pennines are interesting in this respect. Noteworthy too is the popularity of artefact deposition in internal pits in Highland Scotland a feature which may be linked to the stalling of cattle.

The Irish Sea region – comprising mostly settlement in south-west Scotland – like Highland Scotland has a number of similarities with other regions – bar the Midland Plain. Communities here then were very fluid but do seem to have most in common with the communities of Highland Scotland (table 9.1). Again, circular walled structures are early here and are also potentially pastoralist in nature such as LrNeo Beckton Farm with its seemingly early ring-ditch and the large size of structures at LrNeo-EBA Lintshie Gutter – again unusually early for this architectural feature. Contiguous timber walled structures are dominant, revealing a more intensive use of timber, as opposed to a greater use of turf to the north and stone to the east. Fields – in close proximity to the house at least – are absent whilst yards are dominant. The suggestion is that pastoralism has an increasingly important role in the subsistence economy than in other regions and this is perhaps confirmed by the popularity of annular and radial partitions. Patterns in dual flooring reveal an emphasis on the hearth and the tradition of deposition in the hearth on abandonment is also most popular here. Similarities with the North Sea region alone include the greater use of paved flooring and more multiple rebuild activity suggesting an even greater degree of sedentism than in Highland Scotland amongst communities engaged in systems of lineage. Both also share a tradition of settlement-based display through elaborate enclosure with communities in north Wales.

The prehistoric communities of the North Sea region are the least culturally distinct of the communities in northern Britain. With few cultural identifiers - only the popularity of the short porch is distinct – they are characterised more by the *range* of their domestic features, for example the region has the greatest variety of structure type and a greater variability in the position of the hearth. It is perhaps not surprising then to find that circular walled structures have later origins – particularly in north-east England - than in north and west Scotland and it is with these very groups to the north and west that the North Sea region has the strongest links. It

²⁹ Remembering that the study excludes the substantial architectural forms of the Atlantic communities.

is interesting then that it is in this 'new' region that house-based ritual traditions are most popular, with more constructed deposition during the foundation period and more deposition on the floor on abandonment. Ritual traditions are particularly popular in the LrIA-RIA periods and it is also at this time that the region seems to have many similarities with communities in north Wales. Both regions have a high degree of craft production and both reveal more iron forestry tools, particularly in large upland enclosures. The region has slightly more links with the Irish Sea region than with Highland Scotland. Similarities with Highland Scotland alone include the distribution of ring-ditch structures and the high proportion of ring-bank structures, revealing similarities in land-use and economy. Similarities with the Irish Sea region include a relatively high proportion of multiple rebuilding activity and both share a tradition of elaborate enclosure with north Wales. Some similarities with Yorkshire appear to be related to livestock stalling.

9.3.2 Central Britain

Fig. 9.5 reveals central Britain – the area covered by the Midland Plain and Yorkshire Pennines regions – to be culturally distinct from those communities to the north and west. The two regions are seemingly well-connected with each other and have very many similarities including settlement type and location, land-use and economy, and social system. As might be expected there is little use of stone and post-built structures are dominant, both areas also have the largest number of hurdle-built structures. Both have more external hearths implying greater use of seasonal structures and both have more lone domestic structures and fewer occupation deposits. This implies that settlement was less likely to be long-lived in these areas: ageing structures were less likely to gain a secondary function and middens did not often form over abandoned house sites. There is also less rebuilding activity here than elsewhere. In both regions external pits and the use of post-built rectilinear ancillary structures is more common which suggests that arable agriculture was an increasingly important part of the subsistence economy in these areas. Both regions also have a higher proportion of ritual deposition in drainage-gully terminals. Less rebuilding of structures reveals fewer ties with the land and instead a system of single generational shifting settlement.

Of these two regions it is the Midland Plain which seems to be the more traditional – i.e. the more culturally distinct – and also the more insular of the two. It is in this region – along with north and west Scotland – where much of the earliest walled circular structures have currently been found. The Midland Plain region is seemingly not connected with any regions except the Yorkshire Pennines and is presumably more southward looking. The Midland Plain has a higher proportion of short-term settlement: there are more lone-function structures and more without a hearth. The latter might however indicate the greater use of ancillary circular structures. Less emphasis is placed on peripheral space, there is less annular division of space and internal pits

are less popular than elsewhere. Cattle stalling is seemingly less popular than in Yorkshire. There is more evidence for textile production here and sheep may have been dominant in an arable-based mixed farming economy. Ovens are also more popular here than elsewhere.

Contrasting with the apparent insularity of the Midland Plain region, the Yorkshire Pennines region does reveal some similarities with northern Britain. These are predominantly in the use of space, in particular those features which appear to be associated with the stalling of livestock. Features shared with more northern regions include a greater structure size, paved annular flooring, annular and radial partitions and the greater likelihood of a central hearth. This seems to indicate the dominance of cattle in what has been shown to be an arable-based mixed farming economy. Interestingly there is little evidence for textile production which may reveal the lesser importance of sheep in the economy. The Yorkshire Pennines region has less elaborate enclosure than its southern neighbour and fewer elaborate porches than elsewhere. As such, communities here were less likely to engage in display-based architectural traditions at household or community level. In flooring there is a greater left-right emphasis than elsewhere.

9.3.3 North Wales

North Wales is sufficiently culturally distinct to warrant separate discussion. Despite its proximity to Central Britain no similarities were found between the two and it may be relevant here that a significant stretch of land between north Wales and the Yorkshire Pennines region appears to have a genuine dearth of prehistoric settlement. It seems that land travel from west to east was uncommon in this part of Britain. The only similarity between the regions is in the greater likelihood of a more easterly orientation as opposed to a more southerly orientation further north. This, however, may be linked to the greater need to maximise daylight in the north especially during the shorter winter days³⁰. Instead, north Wales has more links with the communities of northern Britain. Many of these similarities might be seen as environmental, for example, the greater use of stone in walls and floors and greater use of partitions. The regions do seem to share some cultural factors, for example middens are more popular here as in Highland Scotland and house-based display is also popular in both. Community-based display is shared with the Irish Sea and North Sea regions where cooking-pits are also unpopular. The latter, however, may be in reaction to harder geologies. The greatest similarities are with the North Sea region, especially during the LrIA-RIA. Particularly interesting is the popularity of craft production in these regions as opposed to elsewhere.

³⁰ Richards (1990) remarks that there are as few as five hours of daylight at midwinter on Orkney for example.

The region has more stake-built structures but fewer ring-banks and least external hearths which suggests that seasonal land-use is perhaps less popular here than in other regions. The greatest amount of evidence for textile production, provision of internal drains and the generally smaller size of structures may reveal that sheep had a greater role in the mixed farming economy than in other regions. More multi-functional structures might suggest that sites were occupied longer here than elsewhere with ageing structures gaining a secondary function. As a result, settlements may have been more sedentary but apparently less involved in systems of lineage than those further north. Finds deposition is more varied here than in other regions and communities instead seem to engage more in both household and settlement-level display: in other regions only one type of display activity tends to be dominant. Ritual traditions then are more varied in north Wales and this may be linked to the fact that circular walled architecture in the region has later origins: the communities less traditional than those further north. Unlike the Yorkshire Pennines region however – another region where walled circular architecture has apparently later origins – links between north Wales and other regions in the study area are less prescribed. It would be interesting to see if the region has more in common with communities to the south.

9.4 Change Through Time

Table 9.2 is a summary of information on chronological change in the domestic sphere throughout prehistory. The following sections attempt to break this down into narrative and are – through necessity rather than choice – prone to generalisation. Figs 9.9-9.10 are a less challenging breakdown of the main themes. This is a discussion of the major trends. The preferred interpretation followed here is that ritual practice is identified in enclosure orientation, architectural display and deposition practices. Pastoralism is identified in use of space – partitions, flooring, periphery size – as well as in wear, settlement location, yards, and perhaps internal pits. Sheep in particular are linked to restricted movement at the entrance, textile production, and internal drains. Cattle are seen in larger, lower structures; sheep in smaller, upland structures. Evidence for arable agriculture is seen in carbonised grain, querns, middens and fields with external pits and ancillaries as evidence for storage. Bounded space is taken as evidence for mixed farming. Changes in the weather are seen in the provision of hearths, porches and the use of external space. Transhumance is seen in the greater use of external space, repair and multiple rebuilds, short-term structures, and north-easterly orientation. Year-round occupation is seen in south-easterly orientation. Sedentism is seen in rebuild activity (and in some cases repair), multi-function structures, and perhaps in the formation of occupation deposits. Shifting settlement is seen in a high degree of structure abandonment as opposed to maintenance, short-term structures, and of lone-function structures. House size and the popularity of the cooking-pit – a feature indicative of large-scale food production and attempts at social cohesion – give some indication of community size. Aggression/tension is seen in the

use of highly visible landscape locations. All conclusions are drawn from the current dataset alone. No ideas are drawn from other data types and this is a narrative of prehistory based solely on evidence from the domestic sphere.

9.4.1 The Later Neolithic

A fairly mild climate is indicated with little need to optimise light or heat. Pit-hearths and hearthstones are set into floors of beaten earth and there are few internal pits. Floor space is unpartitioned but livestock are stalled within the house at one in ten structures and external space is bounded. Arable agriculture is relatively popular and craftworking activity is high. Settlement is unenclosed and landscape position is varied although the high uplands are avoided. There is no use of stone except in the utilisation of bedrock. Structures have post-built, contiguous, or stake and wattle walls and are usually small - there are as yet no triple-rings – and oval, with a high degree of radial symmetry. A degree of sedentism exists in some communities, alongside shifting settlement systems. Seasonal use of landscape is implied whilst a high proportion of structures see year-round occupation. Few occupation deposits suggest an abandoned house only rarely becomes the focus for waste disposal.

At around 2000 BC some use of stone begins with stone walls, ring-banks and stone floors. The post-built structure becomes the most popular structure type. At this time we have the origins of porches, partitions and a decline in door width – increased measures to control movement into the structure - at the same time that there is an increase in the proportion of byre-dwellings: a general growth in pastoralism – both cattle and sheep. There seems to be a decline in arable production alongside a growth in seasonal land-use, particularly on lower-lying land but also on the higher slopes. A sudden increase in shifting settlement occurs alongside the beginnings of a more general long-term decline in such activity: suggesting the origins of greater ties with the land. There is a growth in the maximisation of shelter and light. There is growth too in structure size corresponding with the beginnings of a general decline in ovality and a steady increase in post-ring symmetry alongside the origins of axial symmetry. Craft production is removed from the house and takes place externally. Floor space is divided chordally with an emphasis on the front-rear and left-right use of space and there may be an element of architectural display in the use of elaborate porches.

9.4.2 The Earlier Bronze Age

During the Early Bronze Age there is a rapid increase in concern for maximising shelter and light alongside an increase in the provision of porches and a rapid growth in the use of partitions, particularly at the entrance. There is a general decline in the external use of space

with craft production again taking place indoors. The subsistence economy sees the growth of sheep farming, at the expense of cattle-rearing, and the growth of arable production alongside the origins of fields/plots near to the house and use of middens. There is decline in some factors relating to both transhumance and shifting settlement but increase in others suggesting the co-existence of different systems. Skill in house design continues to increase, alongside a dramatic increase in the use of stone and the origins of wooden floors. Most popular are stone-built and post-built structures. There is greater concern with visibility in the landscape with the origins of summit and ridge locations. The introduction and popularity of the cooking-pit implies some larger domestic groups – with a meat-based diet – perhaps confirmed by an increase in central space and the continued increase in popularity of the attic/loft. Division in space is now based around centre-periphery. There is rapid growth in house-based display alongside the origins of foundation deposits: constructed deposition and deposition in pits.

The Middle Bronze Age is a period of significant social change including the origins of enclosed settlement. There is continued decline in cattle-raising – sheep farming is dominant – alongside a general increase in local arable production with increased storage. Much settlement moves into the high uplands at the expense of the high slopes with c 55% of structures at or above 200 m. Nevertheless there is a decline in ridge and summit locations and a move towards east-facing slopes. Perhaps unsurprisingly there is greater concern with providing and maximising heat alongside a shift towards SSE orientation thus maximising shelter and light in winter. Again there seem to be the co-existence of different settlement systems but with a general increase in sedentism. The decline of cooking-pits with the introduction of slab settings imply a slight shift in diet: less meat, more bread. A further increase in use of an attic/loft and the introduction of very large (> 14 m diameter) structures might imply continued population growth and/or the origins of larger social groups. We see the origins of metalworking and of textile production alongside a general growth in craftworking activities. There is continued increase in architectural design, with axial symmetry dominant for the first time, alongside real variety in structure type. We also see the origins of a trend in favour of stronger contiguous timber walls (fig. 9.12). There is a slight increase in the use of timber – especially for flooring – and we have the origins of hurdle-built structures, as stake-built structures are at their most popular. Use of space remains the same with a slight increase in annularity. There is loss of house-based display and settlement enclosures are oriented on summer sunrise and winter sunset. There is a significant increase in domestic ritual activity. Deposition on construction becomes more popular and we see the origins of deposition in drainage-gully terminals. At this time too the practice of deposition on abandonment – finds on the floor and in occupation soil – begins.

9.4.3 The Late Bronze Age

The Late Bronze Age sees a slightly more relaxed attitude to weather conditions. Pastoralism remains low but there is again growth in arable production with dominance of local fields/plots with middens at their highest ever level but there is no storage. There is continued decline in cooking-pits and instead the origins and popularity of the oven. There is general stability in location but some retreat from the high uplands alongside the loss of ridge and the growth of summit locations. There is a major change in settlement system with the decline of transhumance and the rapid growth of shifting settlement. Those houses that aren't abandoned are rebuilt revealing greater sedentism in some communities and most houses now face south-east. There is a growth in metalworking and a decline in the size of household groups: a move away from the larger social groups of the MBA. Increasing architectural knowledge sees the rapid growth of true circularity and post-ring symmetry reaching a peak. There is a decline in the use of stone and increase in turf with post-built structures dominant and the origins of the turf wall without stone bank foundations. Hurdle- and stake-built walls remain popular. There is a decline in wooden floors as beaten earth floors are again dominant. The annular division of space continues and we see the origins of elaborate enclosure. Ritual deposition is less prominent than in the MBA but we do see the origins of deposition in the hearth on abandonment.

The period surrounding 800 BC is the most significant episode of social change in prehistory. We see a population continuing to adapt to decline in weather conditions. There is rapid growth in cattle-based pastoralism – at the expense of sheep - and a decline in local arable production alongside the reintroduction of storage facilities. There is a loss of activity on the high slopes and a rapid retreat from the uplands with a corresponding growth of lower-lying settlement: c. 75% of structures are now at or below 100 m. Alongside this is a sudden increase in summit locations perhaps indicating tension in the landscape. There is dramatic increase in structure size with c. 80% at > 8 m and a rise in triple-rings suggesting an increase in household and/or herd size. This - alongside evidence for increased storage - implies the greater importance of the community, a social form moved away from in the LBA proper. There is once more a return to popularity for the cooking pit and a meat-based diet. There is a general decline in craft production including the loss of textile production. Simple-ring structures are at their most popular since the LrNeo and there is a rapid increase in structures without a hearth, perhaps ancillary structures. Rather than seeing this as evidence for the decline of sedentism and a move towards shifting settlement, it is instead seen as signalling fragmentation in the domestic sphere.

Larger groups sleep in a main byre-dwelling and work by day in separate structures. Alternatively, it is evidence for the growth of a hierarchy of settlement in the landscape; or of

the polarisation of different economic systems. Sedentism in fact increases: structure orientation is standardised to its greatest ever level towards winter sunrise and there is a continuing decline of short-term structures and this is another indication of poor climate. There is a sudden, dramatic decline of rebuilding activities marking a return to the MBA situation where the majority of structures are repaired. There is an increase in the incidence of multiple rebuilds: half of rebuilt structures are being rebuilt twice. Rather than evidence for transhumance this might be seen as evidence for lineage systems. Use of space remains annular. The rapid decline of occupation deposits means waste disposal is not taking place on abandoned houses. There is a decline in elaborate enclosure with instead the reintroduction of elaborate porches: emphasis is on the household again, a tradition lost following the emergence of enclosures. True circularity reaches its peak but there is a decline in post-ring symmetry for the first time. There is also a decline in the use of stone, except in flooring, alongside a further increase in the use of timber with contiguous timber walls at their most popular: *c.* 50%.

9.4.4 The Early Iron Age

There is continuing reaction to a poor climate. Cattle-based pastoralism continues alongside an increase in sheep farming for first time since the EBA. There seems to be a subtle shift in farming strategy with more mixed farming and changes in arable agriculture: the increase of local fields/plots and pits but the decline of rectilinear ancillaries and the loss of middens. There is a decline in lower-lying settlement alongside a slight return to the higher slopes and high uplands. There is evidence for both an increase in sedentism and of shifting settlement alongside a decline in transhumance. A decline in summit locations signals reduced tension in the landscape and the rapid decline in structure size - *c.* 65% are < 8 m in diameter – and loss again of the cooking pit - points to smaller social groups. There are less ancillary structures and a decline in metalworking. Increased use of stone comes alongside the rapid decline of contiguous timber walls but a rapid decline in stone floors accompanies the reintroduction of wooden floors. Use of turf increases: post-built structures rise again and turf mass walls are at their most popular. Many aspects of architectural design appear to have finally reached their ceiling and there is a rapid decline in true circularity. Use of space remains annular. There is a rapid growth of elaborate enclosure alongside continuation of house-based display and increasingly standardised eastern enclosure orientation. It is at this time that we have the strong origins of deposition in the post-abandonment period, at the same time constructed deposits fall and deposition in pits flourishes.

At around *c.* 400 BC, it seems that the weather gets worse again. Pastoralism is still important but there are some indications that animals – particularly sheep - are beginning to be moved out of the house and there is a further increase in settlement enclosure. This might be evidence for

changing practice as a result of a securer landscape: animals can be safely stalled outside the house. There is again decline in local arable production and the rapid growth instead of storage facilities. There is the growth of transhumance again but it is now a different system, with the continued retreat from lower-lying land and the loss of high slopes. Instead more settlement is on the lower slopes with a focus on those which are south-facing. There is continuing use of the high uplands and the growth of short-term shifting settlement; nevertheless, some sedentism remains. The strong reintroduction of the cooking-pit might suggest a return to larger social groups. There is an increase in ancillary structures and a growth of craftworking, especially textile production. Despite a fashion for stone floors rather than wooden floors, there is a general decline in the use of stone. Use of turf increases again with post-built structures dominant and turf mass walls still common. There is stability in house design and real variety in floor and hearth type. A general increase in ritual activity is indicated with rapid growth in both house and settlement-based display. Elaborate enclosure peaks with fairly standardised south-east enclosure orientation.

9.4.5 The Later Iron Age

Climate seems to improve. Iron tool technology improves. Pastoralism continues but cattle continue to be moved out of the house and yards are introduced. Local arable production re-emerges alongside a rapid decline in storage facilities. There is greater variability in location with use of valleys and ridges again for the first time since the LrNeo and MBA respectively relative stability in use of landscape with the continued growth in use of the high uplands – reaching a new peak – and a return to the upper slopes. There is the decline of short-term shifting settlement and perhaps the beginning of decline in transhumance but also of sedentism: settlements last a generation or two at most. The period sees the decline of craftworking especially of textile production. Nevertheless there is a growth of metalworking. Growth in structure size suggests population increase. In light of this the decline of the cooking-pit is problematic but may suggest that enlarged social groups no longer need to *demonstrate* social cohesion. There is a slight increase in architectural design skills and again an increase in the variety of structure type. Contiguous timber walls are more popular again alongside decline in wooden floors – but post-built structures remain popular. There are fewer turf walls and a decline of stake walls with instead a resurgence of hurdles. There is a rapid growth in the use of stone and some evidence for clay/daub ring-banks. The period sees a rapid decline in display activities with instead a trend towards the eastern orientation of houses and a new variety in the use of space, however annularity remains dominant. There is a rapid decline in elaborate enclosure and enclosure orientation is more varied. Instead, there is the popularity of deposition in drainage-gullies and an increase in ritual deposition on construction.

At around the time of the Roman occupation of southern Britain, north and central Britain remain relatively unchanged. Despite a new flourish of the ring-ditch house in northern England, there is the continuation of a general decline in the byre-dwelling, alongside the growth of bounded external space. There is little change in arable production, which remains local. Middens are lost. There is continuing gradual growth in use of the high slopes alongside a general retreat from the high uplands and greater use of the lower slopes. There is increased variability in siting with the growth of valley, ridge and summit locations. There are some indications of worsening weather. There is decline in transhumance and a rapid growth in shifting settlement. An increase in the proportion of very large structures accompanies a general stability in house size. There is continued decline in craftworking despite growth in textile production. Continued growth in use of stone takes place alongside further decline in wooden floors. Contiguous timber walls remain popular, with decline in post-built, stake-built, and turf walled structures. There is the utilisation of bedrock for the first time since the EBA. Further decline in annularity takes place with front-rear division of space most popular, and the growth of chordal partitions. Concern with houses facing east increases slightly alongside the continuing steady decline of elaborate enclosure. Deposition in pits and drainage-gullies becomes less popular.

In the early 1st millennium AD, we see the growth of pastoralism - especially sheep farming - and some growth in arable production alongside the re-emergence of middens and a further decline in storage facilities. There is decline in lower-lying settlement - cattle-raising appears to be shifting into the lower valleys - with continued growth in use of high slopes and further variability in siting with sustained growth of valley, ridge and summit locations. There is perhaps some transhumance but it is limited. There is a decline in short-term shifting settlement with increasing sedentism. Craft production increases - particularly textile production - alongside the growth in ancillary structures. There is an overall reduction in structure size with c. 70% at < 8 m in diameter. A continuing growth in the use of stone sees stone wall structures making up 60% of structures with the decline of all other types. The continuing emphasis on the house facing east decreases slightly alongside a slight trend towards eastern orientation in enclosures. The decline of elaborate enclosure continues. Front-rear remains the most popular division in use of space - although annularity is a close second - and chordal partitions are dominant. Constructed deposits remain common and there is an increase in the provision of abandonment deposits on floors.

9.5 Later Prehistory: A Narrative

Fig. 9.13 summarises the main socio-economic trends in the later prehistory of north and central Britain, as revealed by the domestic evidence. Circular walled architecture is first found with the Neolithic communities of coastal Ireland (cf. Grogan 2002). In Britain, it has its origins in the later Neolithic communities of north and west coastal Scotland as well as in contemporary communities in southern Britain. The domestic evidence seems to suggest that these communities are engaged in cattle-based mixed farming. By the EBA, the population has increased and larger social groups become increasingly sedentary in reaction to poorer climate. Arable agriculture begins to increase and we have the origins of foundation deposits and house-based display. The MBA is a period of economic growth. Agriculture continues to diversify and there is a move into the high uplands for sheep farming, alongside increasing arable. The origins of enclosure mark the beginnings of a general increase in mixed farming. Craftworking increases with the origins of metalworking and textile production. Large social groups accompany increased ritual deposition and increased use of timber resources. Population increases and there is colonisation of new lands in central Britain (fig. 9.14).

By the LBA, the climate seems to have improved, there is increasing arable production, a retreat from the uplands and a decline in timber resources. If the number of published structures betrays anything about demography this is a period of population decline (figs 9.15-9.16). The size of social groups has decreased and we see increased tension between communities alongside a decline in enclosure and domestic ritual deposition. Despite a general increase in shifting settlement we see the origins of lineage systems at this time and the origins of elaborate enclosure mark the beginnings of community-based display. At c. 800 BC there is further decline in climate accompanied by a period of economic stress with consumption of resources (timber/cattle) and the decline of craftworking. There is a continued, more rapid retreat from the uplands with more emphasis instead on cattle-raising and sedentism. Display shifts from enclosure to the household and tension between communities continues. The social group increases again in size and there is an increase in storage activities, perhaps revealing communal redistribution. There is continued decline in domestic ritual deposition. Pastoralist emphasis contracts to around the Forth (fig. 9.17).

The EIA sees adaptation with a more balanced mixed farming system and less transhumance. There is greater sedentism with more structures per site than at any other time (fig. 9.18). There is a continued decline in craftworking and a decline in timber resources. There is less tension between communities but more emphasis on community identity, despite decline in the size of social group. The household continues to be the focus of display and more deposition takes place in pits. At c. 400 BC, people are continuing to adjust to the climate. There is population

growth and increasing display with a continuing, gradual return to upland-based transhumance. There is increase in craftworking and use of timber resources. Larger social groups and increased storage again implies redistribution. Display is still focused on both the household and the enclosure. Ritual deposition increases with a shift from pits to drainage gullies.

In the LrIA, people have adjusted to the climate and there is rapid population growth (figs 9.15-9.16). There is more arable, more use of iron and the beginnings of decline in transhumance. Pastoralist settlement contracts to the Forth-Humber region (fig. 9.16). There is decline of elaborate enclosure and of storage. Display activities give way to east-facing houses and a continued increase of domestic ritual deposition. The LrIA sees the origins of the greater use of stone. At c. AD 50, society is fairly stable despite a slight decline in climate. Sheep become more important and there is retreat from the high uplands with less craftworking and a decline of timber resources. In the early 1st millennium AD there is more arable, greater sedentism, more craftworking and more ritual deposition. There is a decline in circular architecture in central Britain with the introduction of rectilinear forms and in north and west Scotland monumental architecture becomes dominant (fig. 9.20). In northern England, southern Scotland and north Wales, however, circular architecture continues.

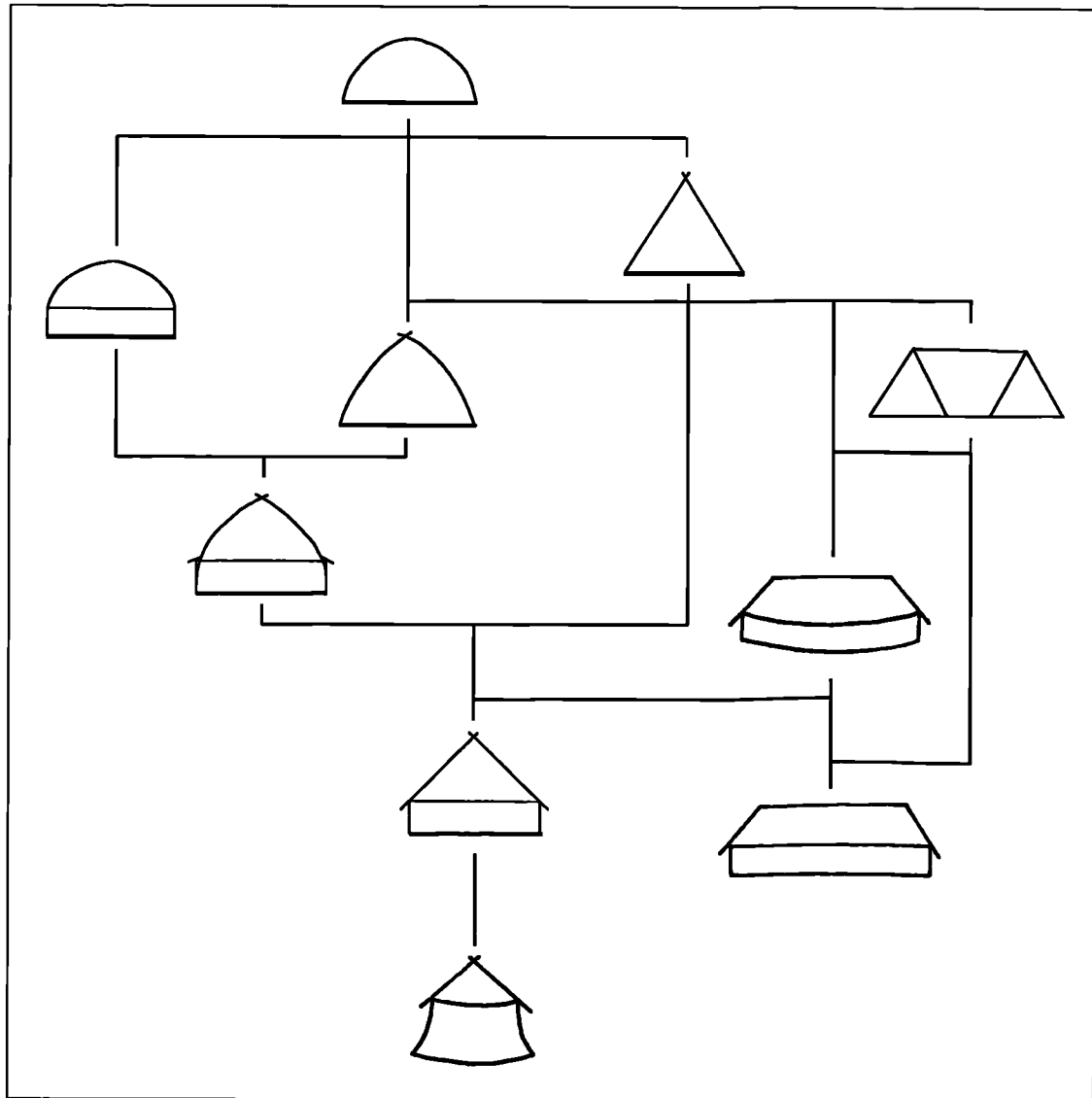


Fig 9.1 A typology of prehistoric architectural forms

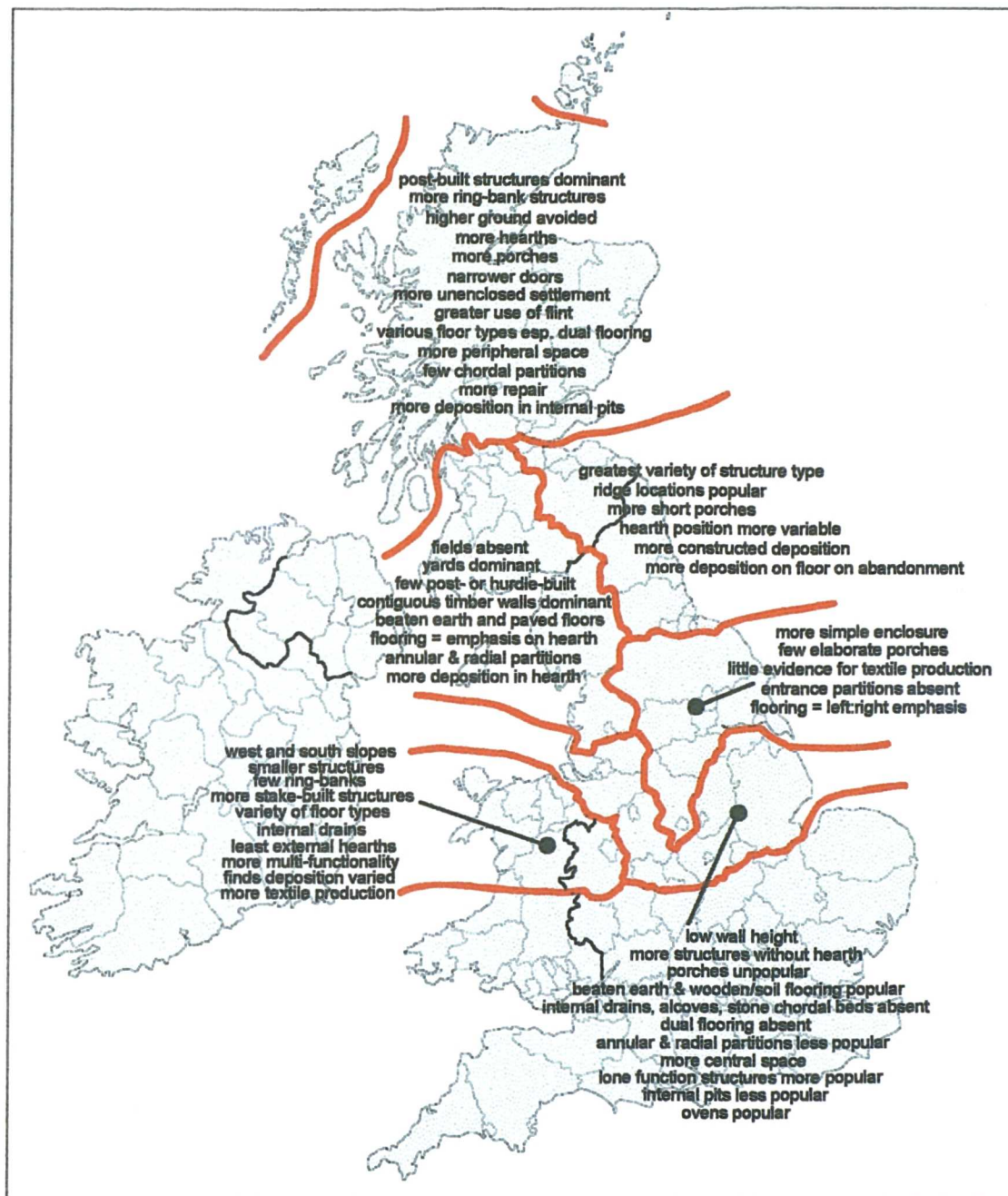


Fig 9.2 Those features specific to each region

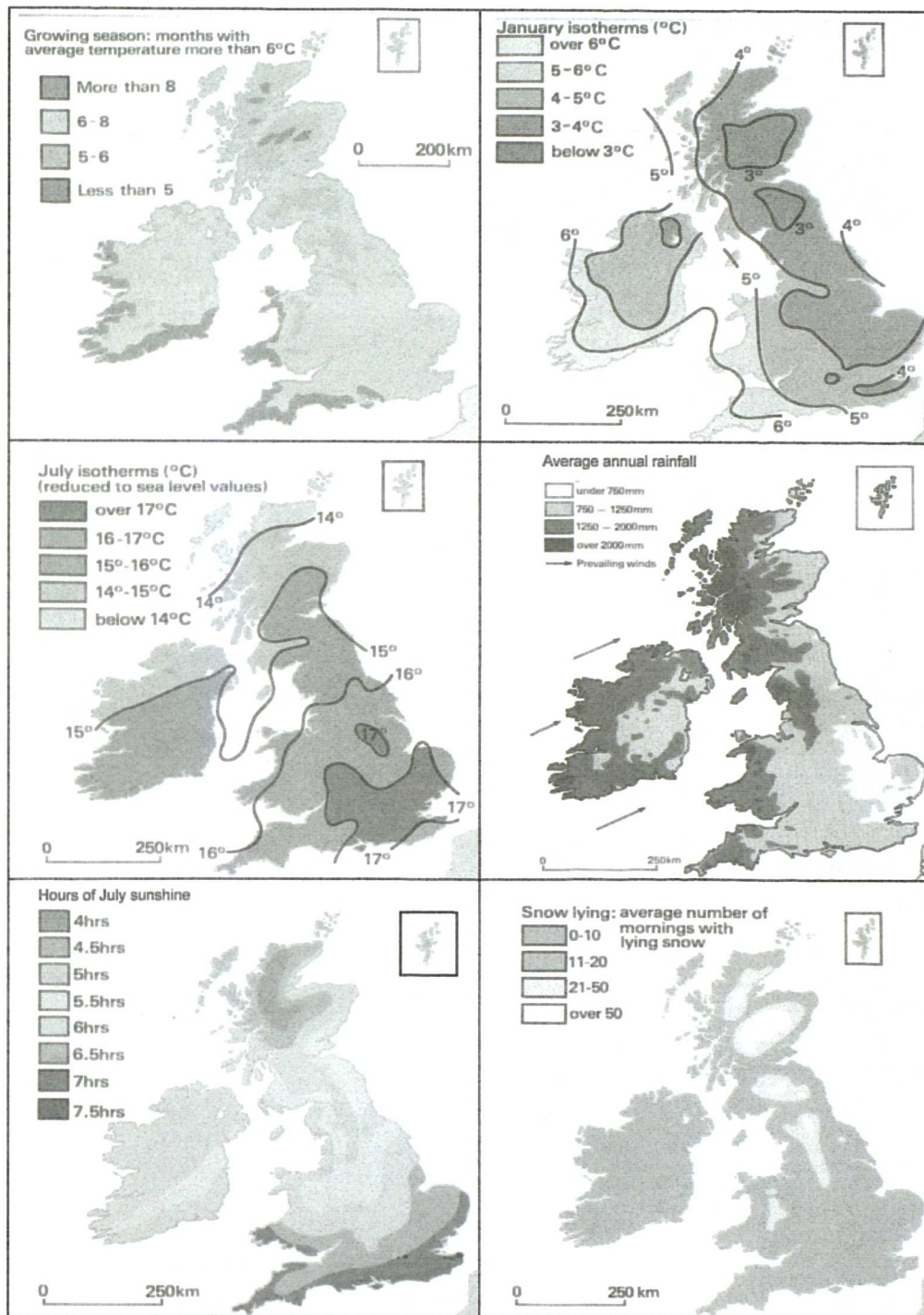


Fig 9.3 Regional variation in modern weather (after Waugh 1983)

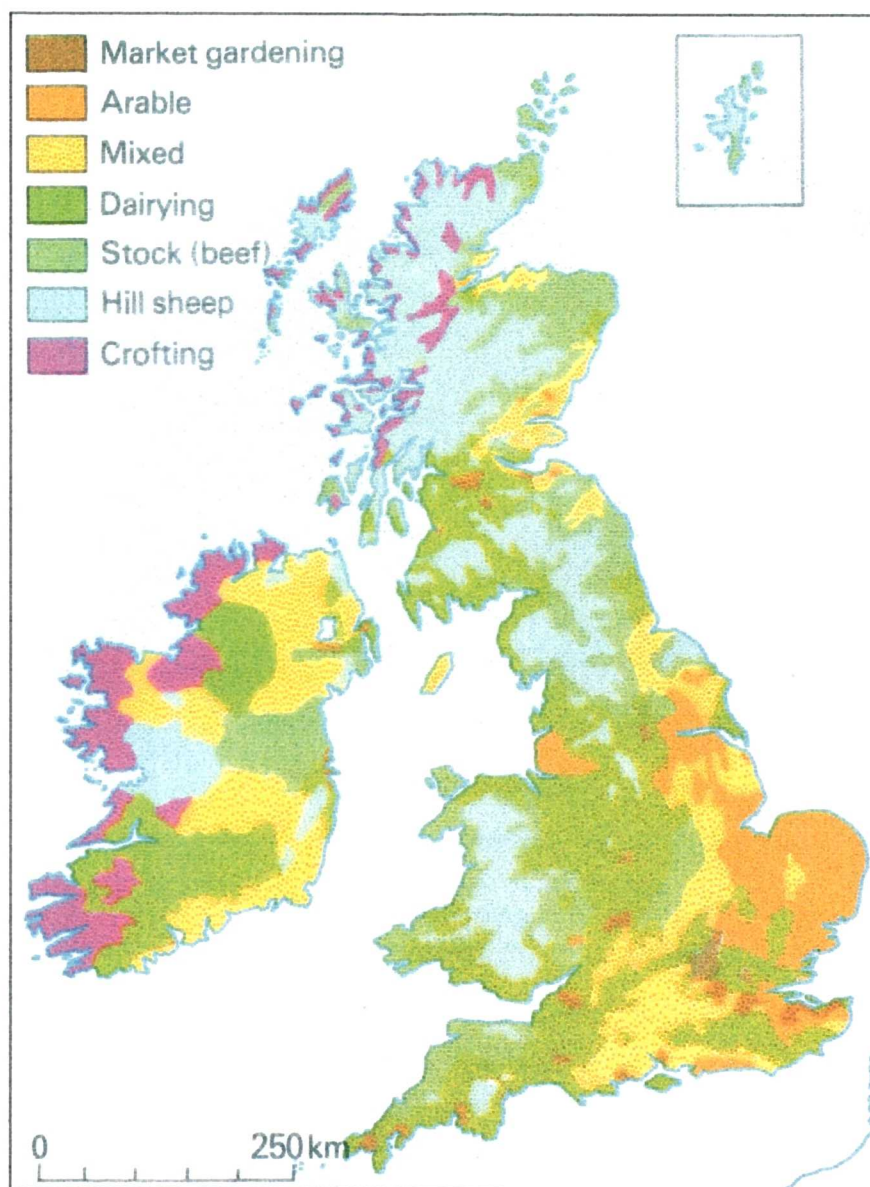


Fig 9.4 Modern, optimised agricultural land-use (after Waugh 1983)

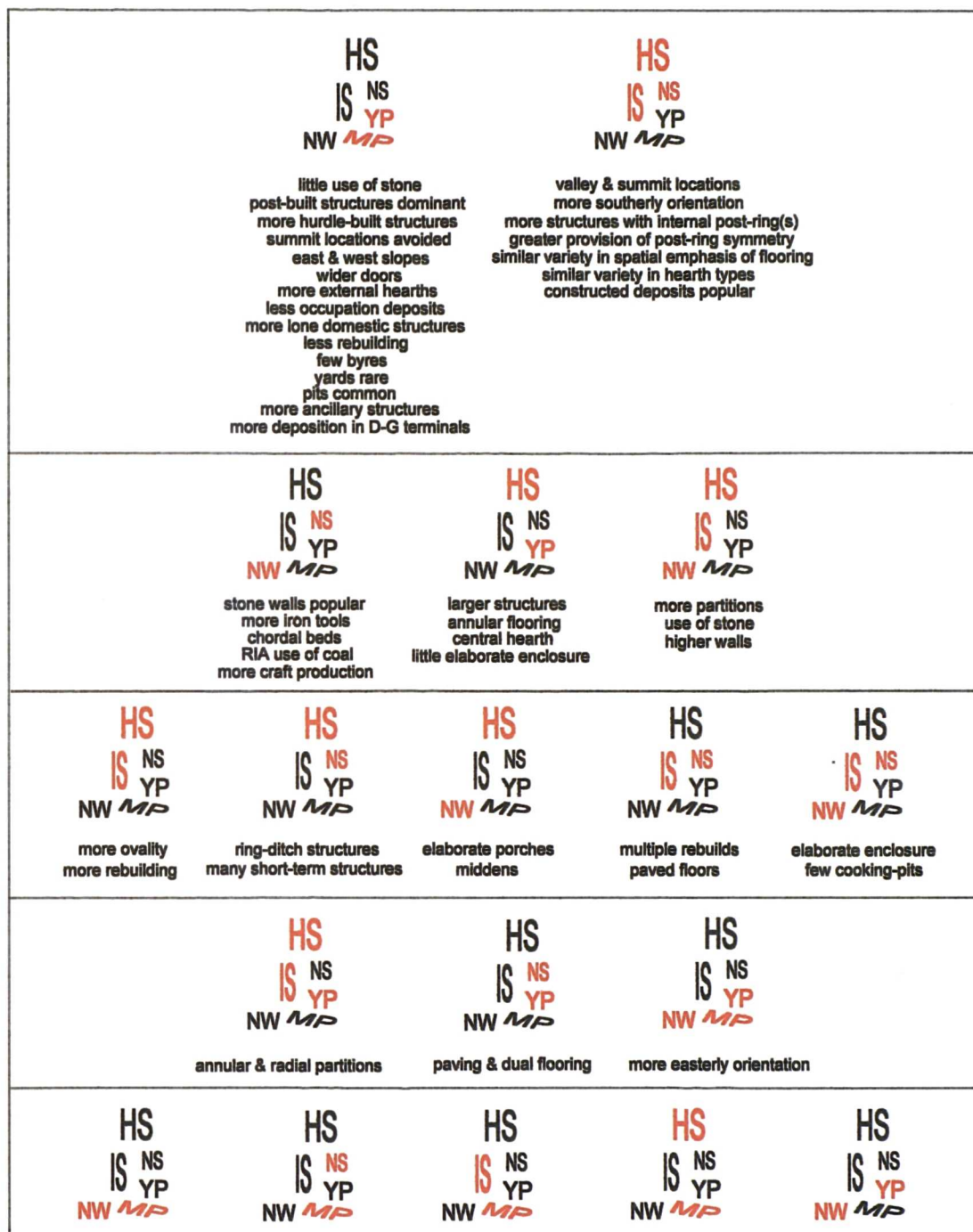


Fig 9.5 Similarities between regions (in red) ranked by number of shared features, with most at the top of the diagram and none at the bottom

	LrNeo	EBA	MBA	LBA	EIA	LrIA	RIA
Highland Scotland							
Irish Sea Region							
North Sea Region							
Yorkshire Pennines							
Midland Plain							
North Wales							

KEY		Post-Built		Contiguous Timbers		Ring-Bank		Stone Wall		Mean Diameter
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Fig 9.6 Dominant structure type and mean diameter through time

	LrNeo	EBA	MBA	LBA	EIA	LrIA	RIA
Highland Scotland	POST-BUILT	<i>RING-BANK</i>	<i>RING-BANK</i>	<i>RING-BANK</i>	<i>RING-BANK</i>	<i>RING-BANK</i>	<i>RING-BANK</i>
Irish Sea Region	<i>RING-DITCH</i>	<i>RING-DITCH</i>	<i>RING-DITCH</i>	<i>RING-DITCH</i>	<i>RING-DITCH</i>	<i>RING-DITCH</i>	<i>RING-DITCH</i>
North Sea Region	POST-BUILT	POST-BUILT	POST-BUILT	POST-BUILT	POST-BUILT	POST-BUILT	POST-BUILT
Yorkshire Pennines							
Midland Plain							
North Wales							

Fig 9.7 Prehistoric architectural traditions

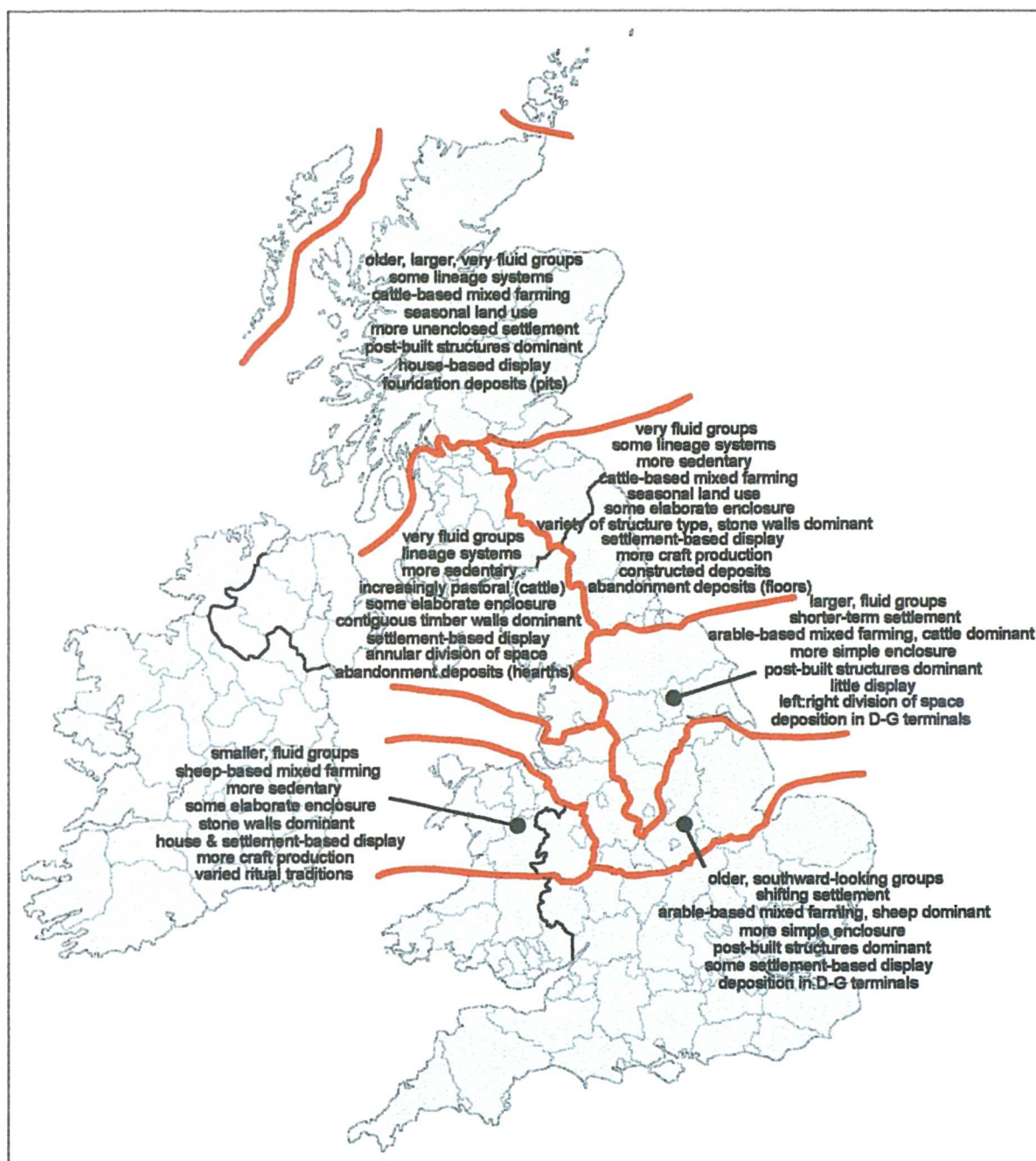


Fig 9.8 Characterisation of regions

		LrNeo	c 2000 BC	EBA	MBA NE; SW	LBA En & Sn	c 800 BC N & SE	EIA Eastern	c 400 BC SE	LrIA Variable	c AD 50 SE	RIA E; Variable
RITUAL	Encl. Orient.	-	-	-	-	10%	Decline	GROWTH	GROWTH	Decline	Decline	Decline
	Elaborate Encl.	-	-	-	-	-	30%	Stability	GROWTH	Decline	Decline	Decline
	Elaborate Porches	-	25%	GROWTH	Loss	-	-	15%	Loss	25%	Decline	Stability
	Short Porches	-	25%	Growth	Growth	Loss	-	Origins	Stability	Growth	Growth	Growth
USE OF SPACE	Ritual Deposition	-	-	Origins	Origins	Origins	Stability	Origins	Stability	Growth	Growth	Growth
	Partitions	-	30%	GROWTH	Decline	Growth	Growth	Decline	Growth	Stability	Stability	Stability
	Partition Type	-	Annular	Entrance	Annular	Annular	Radial	Entrance	Radial	Annular	Radial	Chordal
	Floor Patterning	-	F:R & L:R	C:P	C:P	C:P	C:P	C:P	C:P	C:P; Varies	F:R; Varies	F:R; C:P
PASTORAL	Spatial Emphasis	-	Chordal	A; Discrete	A; Discrete	A; Discrete	Annular	Annular	Discrete	A; Discrete	Discrete; A	Chordal; A
	Peripheral Space	Stability	Stability	Stability	Decline	Stability	GROWTH	Decline	Growth	Decline	Growth	Decline
	Central Space	Stability	Stability	Growth	Stability	Decline	Growth	Stability	Stability	Stability	Growth	Decline
	Internal Pits	10%	GROWTH	Decline	Growth	Decline	Growth	Growth	Growth	Decline	Decline	Stability
ARABLE	Byres	10%	Growth	Decline	Decline	Stability	Growth	Stability	Decline	Decline	Decline	Growth
	Door Width	1.9 m	Decline	Stability	Stability	GROWTH	Stability	Decline	Growth	Growth	Decline	Stability
	Yards	-	-	-	-	-	-	-	-	10%	Stability	Growth
	Internal Drain	-	-	Origins	Loss	-	-	Reintro	Loss	Reintro	Decline	Growth
SITING	Enclosure	10%	Loss	-	50%	Stability	Growth	Decline	GROWTH	Stability	Stability	Stability
	Boundaries	20%	Loss	40%	Loss	-	20%	Growth	Loss	20%	Growth	Growth
	Grain/Querns	15%	Decline	Growth	Decline	Growth	GROWTH	Decline	Decline	Decline	Stability	Growth
	External Pits	-	20%	Decline	Growth	Loss	20%	Growth	GROWTH	Decline	Stability	Decline
	Ancillaries	50%	Decline	Stability	Growth	Loss	35%	Decline	Growth	Decline	Stability	Decline
	Middens	-	-	10%	Growth	Growth	Decline	Loss	-	5%	Loss	5%
	Fields/Plots	-	-	30%	Growth	Growth	Decline	Growth	Loss	10%	Stability	Stability
	0-100 m	35%	GROWTH	Decline	Stability	Stability	GROWTH	Decline	Decline	Growth	Stability	Decline
	High Slopes	30%	Growth	Growth	Decline	Stability	Loss	10%	Loss	5%	Growth	Growth
	High Uplands	-	-	-	40%	Decline	Decline	Growth	Growth	Growth	Decline	Stability
	Valley	30%	Loss	-	-	-	-	-	-	5%	Growth	Growth
	Ridge	-	-	10%	Decline	Loss	-	-	-	5%	Growth	Growth
	Summit	-	-	10%	Decline	Growth	GROWTH	Decline	Stability	Stability	Growth	Growth
	Slope Orientation	N & W	N & W	N & W	East	N & E	N & E	N & S	South	North	North	South
	Platforms	50%	Growth	Decline	GROWTH	Decline	Decline	Growth	Growth	Decline	Stability	Stability

Table 9.2 Chronological characterisation (continued overleaf)

		LrNeo	c 2000 BC	EBA	MBA	LBA	c 800 BC	EIA	c 400 BC	LrIA	c AD 50	RIA
SEASONALITY	Hearth Provision	60%	Growth	Decline	Growth	Stability	DECLINE	Growth	Growth	Decline	Stability	Stability
	External Hearths	15%	Growth	Decline	Decline	Stability	Loss	-	GROWTH	DECLINE	Stability	Growth
	Int. & Ext. Hearth	40%	Loss	-	10%	Loss	25%	Decline	Loss	15%	Decline	Stability
	Central Hearth	20%	Growth	Decline	GROWTH	Decline	Decline	Growth	Growth	Stability	Decline	Growth
LIFESPAN	Cooking-Pits	-	-	40%	Decline	Decline	Growth	Loss	25%	Decline	Stability	Stability
	Ext. Craft Prod.	25%	GROWTH	Loss	-	10%	Decline	Loss	10%	Growth	Decline	Stability
	Orientation	Variable	NE: SE	ENE: S	SSE	SE	SE	SE	NE	East	East	East
	Porches	-	30%	Growth	GROWTH	Decline	Decline	Growth	Decline	Decline	Stability	Growth
CRAFT	Short-Term CSs	40%	Decline	Growth	Growth	Decline	Decline	Growth	Growth	Decline	Decline	Decline
	Stone Wall Height	-	-	0.60 m	Decline	Decline	GROWTH	Decline	Decline	Growth	Growth	Decline
	Repair (v Rebuild)	40%	Growth	Growth	Growth	DECLINE	GROWTH	Decline	Decline	Decline	Growth	Decline
	Multiple Rebuilds	-	-	-	Growth	Decline	Growth	Decline	GROWTH	Decline	Growth	Decline
SIZE	Abandonment	50%	Decline	Decline	Decline	GROWTH	Decline	Decline	Growth	Decline	Growth	Growth
	Lone Function	30%	GROWTH	Decline	Stability	Growth	Growth	Decline	Growth	Decline	GROWTH	DECLINE
	Multi-Function	-	-	-	5%	GROWTH	DECLINE	Growth	Decline	Decline	Growth	Growth
	Occ. Deposits	10%	Stability	GROWTH	Decline	GROWTH	DECLINE	Growth	Growth	Decline	Decline	Growth
DESIGN	Metalworking	-	-	-	2%	Growth	Decline	Decline	Growth	Growth	Decline	Stability
	Textile Production	-	-	-	2%	Stability	Loss	2%	GROWTH	DECLINE	Growth	Growth
	Craft Function	30%	Loss	20%	Growth	Stability	Decline	Stability	Growth	Decline	Decline	Growth
	S-Rs	70%	Decline	Decline	Decline	Growth	Growth	Decline	Growth	Stability	Stability	Growth
MATERIALS	T-Rs	-	5%	Loss	5%	Loss	5%	Growth	Decline	Stability	Growth	Stability
	Size	6.7 m	Growth	Stability	Stability	Decline	GROWTH	DECLINE	Decline	Growth	Stability	Decline
	Large Structures	-	-	-	5%	Loss	20%	DECLINE	Loss	2%	Growth	Decline
	True Circularity	10%	Growth	Growth	Growth	GROWTH	GROWTH	DECLINE	Stability	Growth	Decline	Growth
	Ovality	60%	Decline	Decline	Decline	Decline	Decline	Stability	Stability	Decline	Stability	Stability
	Symmetry	50%	Growth	Growth	Growth	Growth	Decline	Stability	Decline	Growth	Stability	Decline
	Symmetry Type	Radial	Radial	Both	Axial	Both	Axial	Axial	Axial	Axial	Radial	Axial
	Main Wall Type	P-B; C-Ts	Post-Built	P-B; SW	Variety	Post-Built	C-Ts	Post-Built	Post-Built	Post-Built	SW	SW
	Use of Stone	-	15%	GROWTH	Decline	Decline	Decline	Growth	Decline	GROWTH	Growth	Growth
	Stone Floors	-	20%	Growth	Growth	Loss	100%	DECLINE	Growth	Stability	Stability	Growth
	?Wooden Floors	-	-	20%	GROWTH	Decline	Loss	30%	DECLINE	Decline	Decline	Growth

Table 9.2 continued

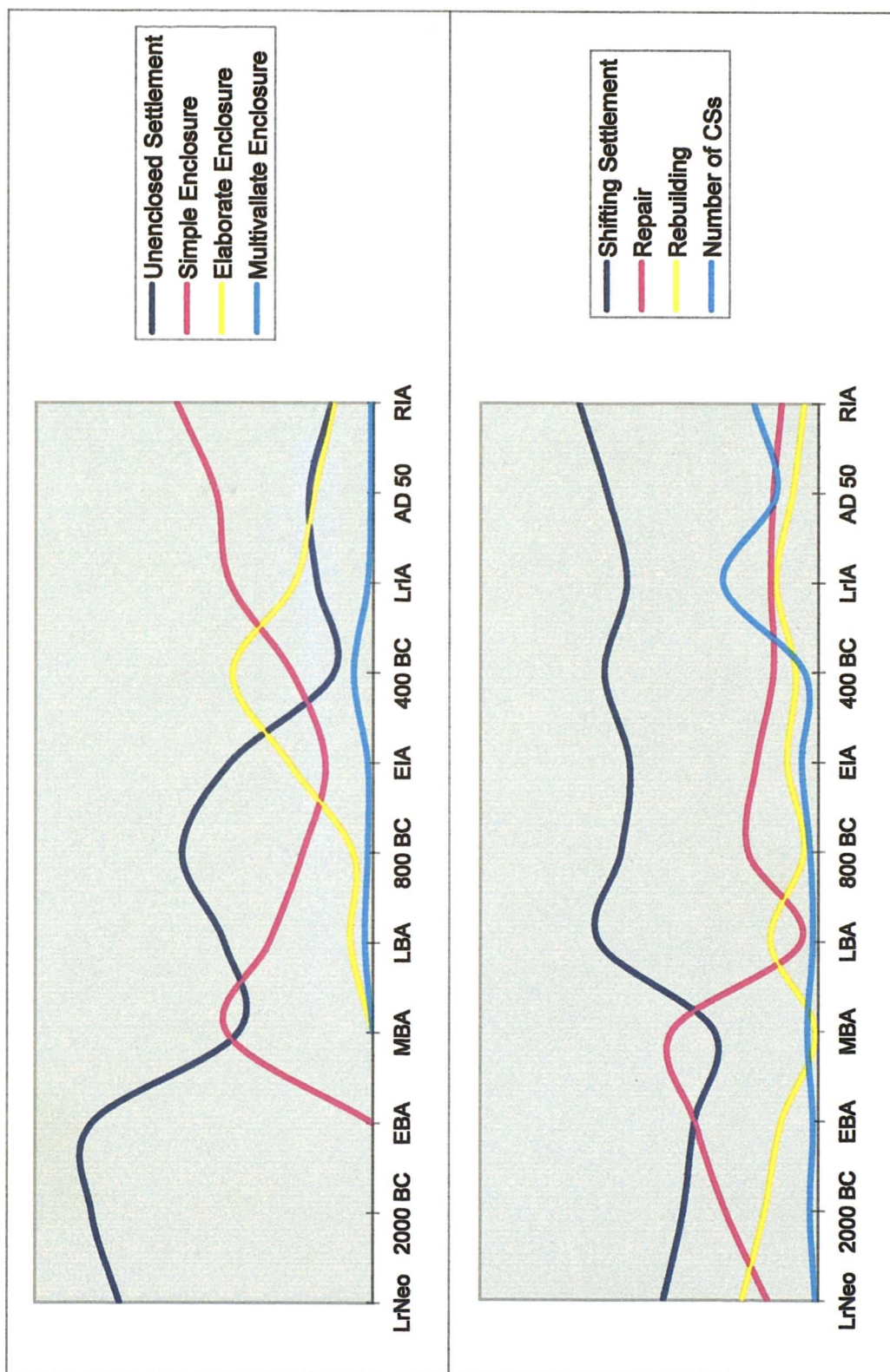


Fig 9.9 Settlement type and settlement system

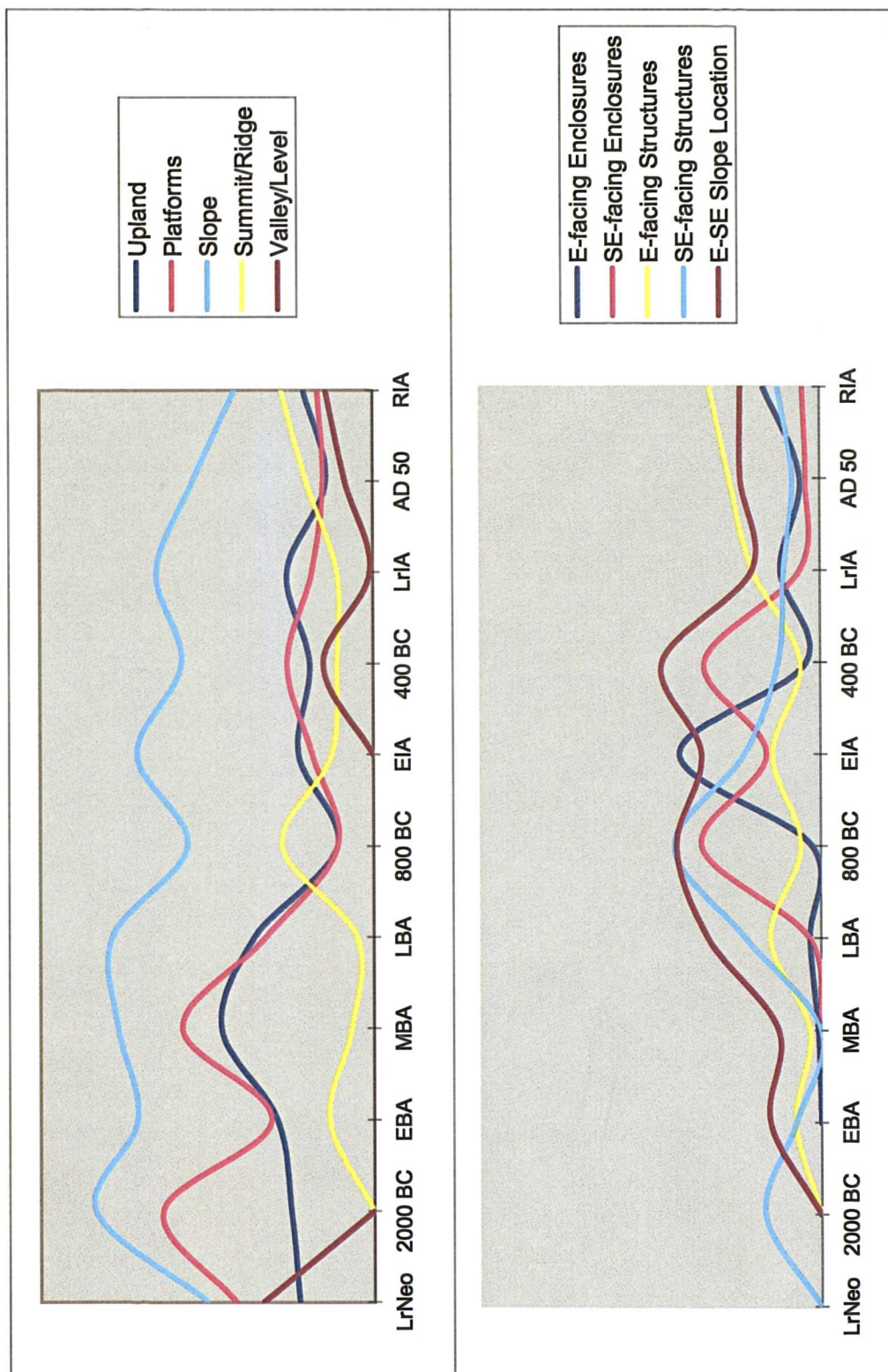


Fig 9.10 Location and orientation

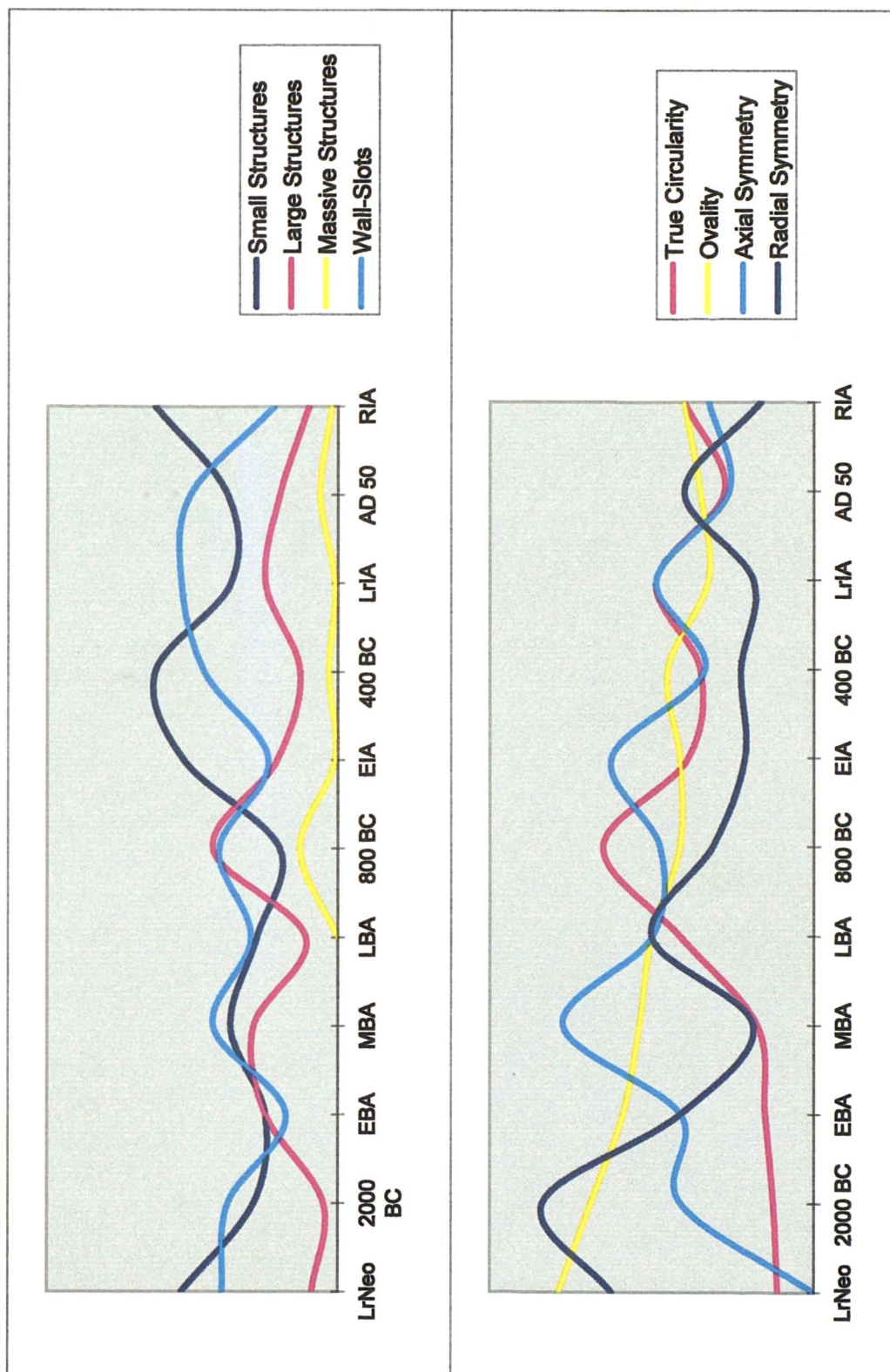












Fig 9.11 Design features

	LrNeo	EBA	MBA	LBA	EIA	LrIA	RIA
Predominant Type		 	 	 			
Mean Diameter	8 m	8 m	9 m	10 m	8 m	9 m	7 m
% of data	39% 39%	29% 24% 24%	43% 20% 20%	50% 24%	67%	54%	67%





KEY		Post-Built		Contiguous Timbers		Ring-Bank		Stone Wall
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Fig 9.12 Main structure types through time

	LrNeo	EBA	MBA	LBA	c 800 BC	EIA	c 400 BC	LrIA	c AD 50	RIA
Subsistence Economy		increasing diversification		more arable	more cattle	more sheep		more arable	more sheep	more arable sheep
Settlement System	coastal	increasingly upland	retreat from uplands	retreat from uplands	slope-based sedentism	increasingly upland		retreat from uplands	sedentism	
Population	increase	colonisation	decline	increase	rapid increase	stable				
Social Behaviour	household identity	aggression	community identity	lineage identity	household identity	enclosure orientation	community identity	house orientation		
Activities		storage	more bronze crafts	storage	more bronze storage	storage	more iron crafts	more iron crafts		more crafts
Domestic Ritual Deposition (<i>in context - R&P</i>)		increase	decline	origins	pits & post-abandonment	increase	D-Gs constructed	increase	deposition	increase

Fig 9.13 Main trends in the later prehistory of north and central Britain as revealed by the domestic evidence

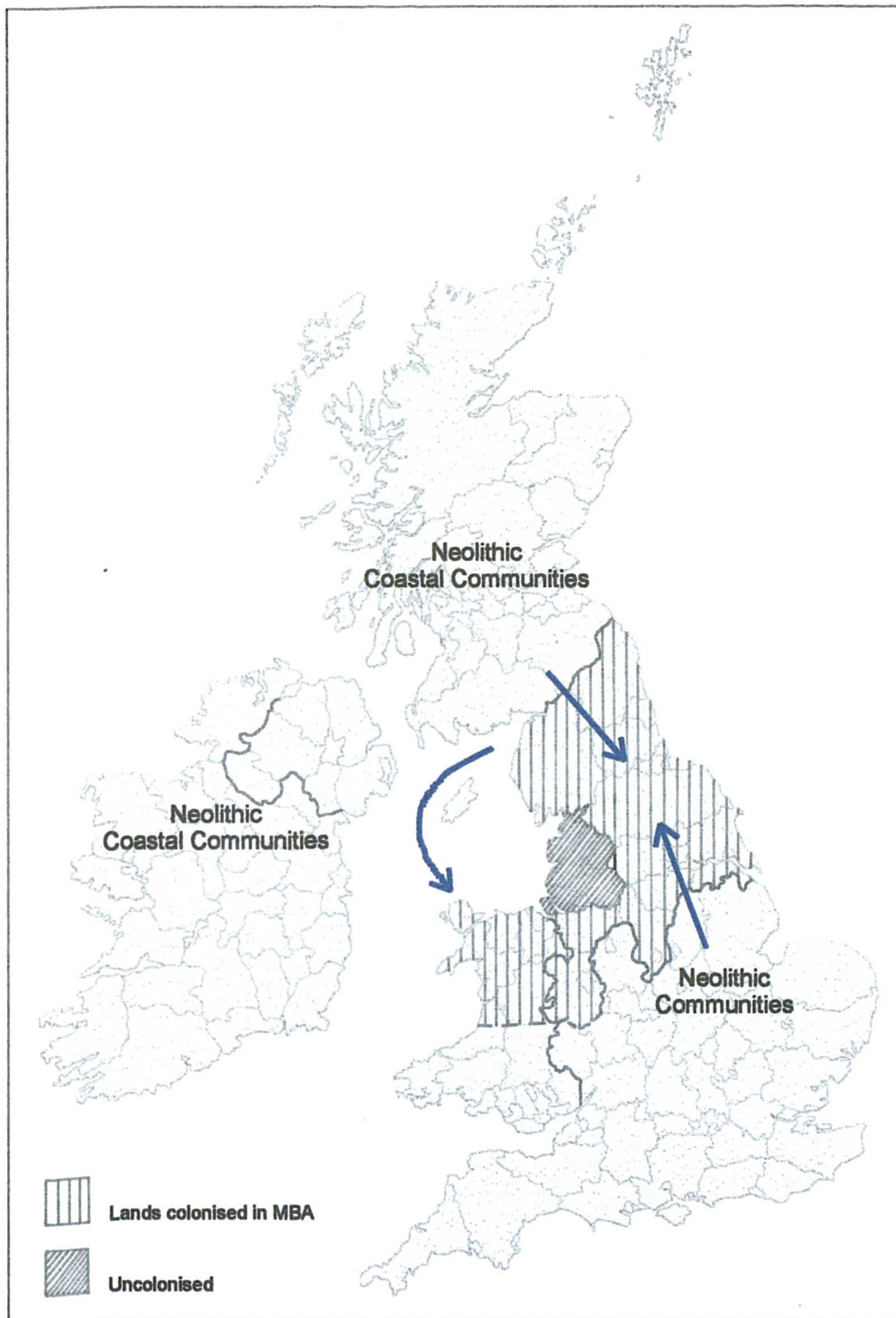


Fig 9.14 Early developments in walled circular architecture

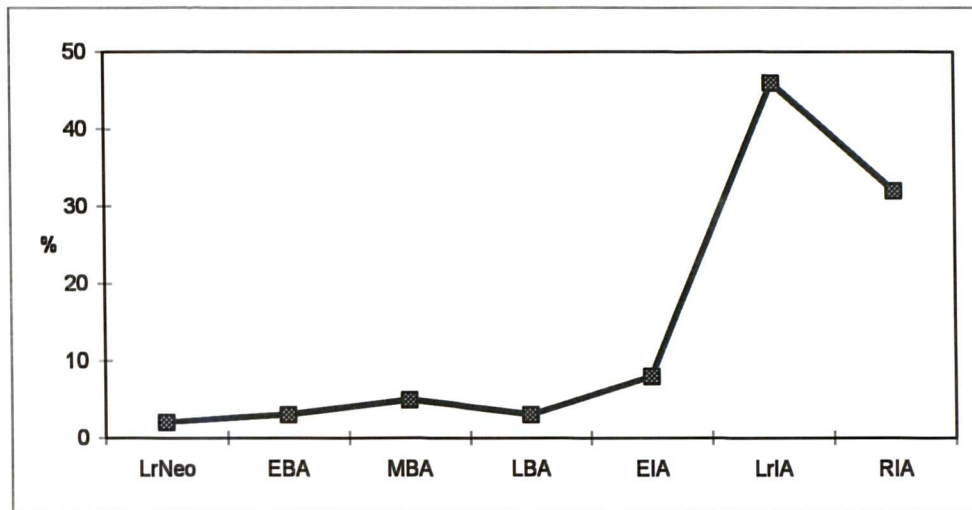


Fig 9.15 No. of circular structures: chronological breakdown

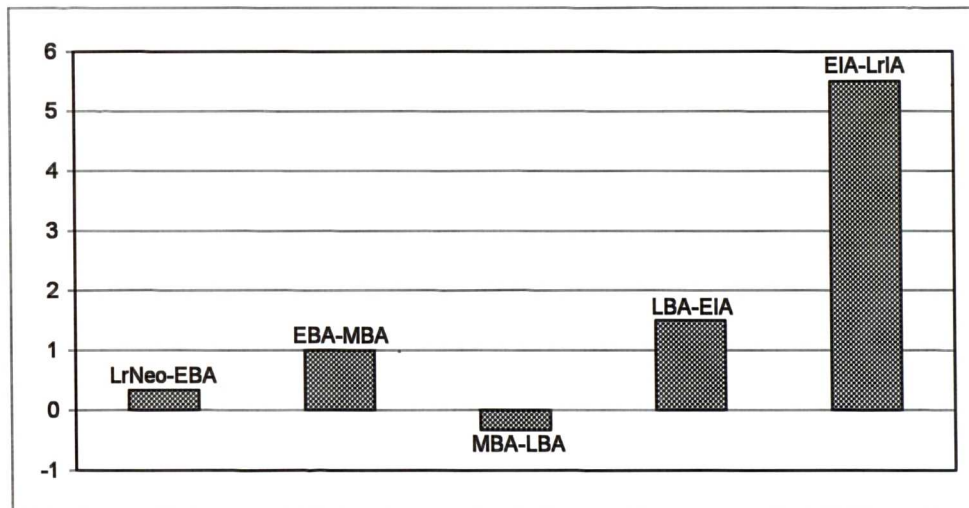


Fig 9.16 Growth rate

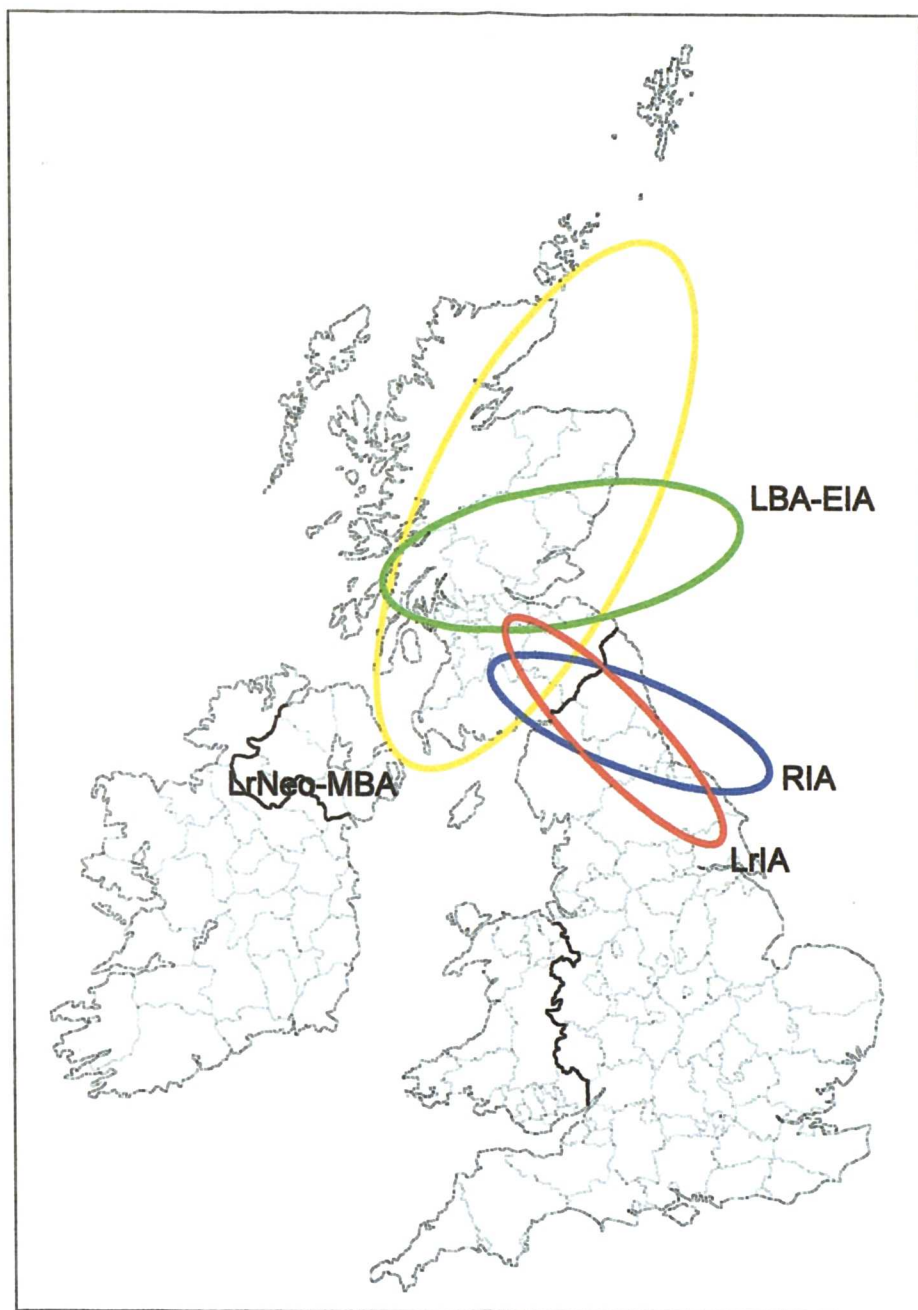


Fig 9.17 The shifting focus of pastoralist settlement north of the Humber

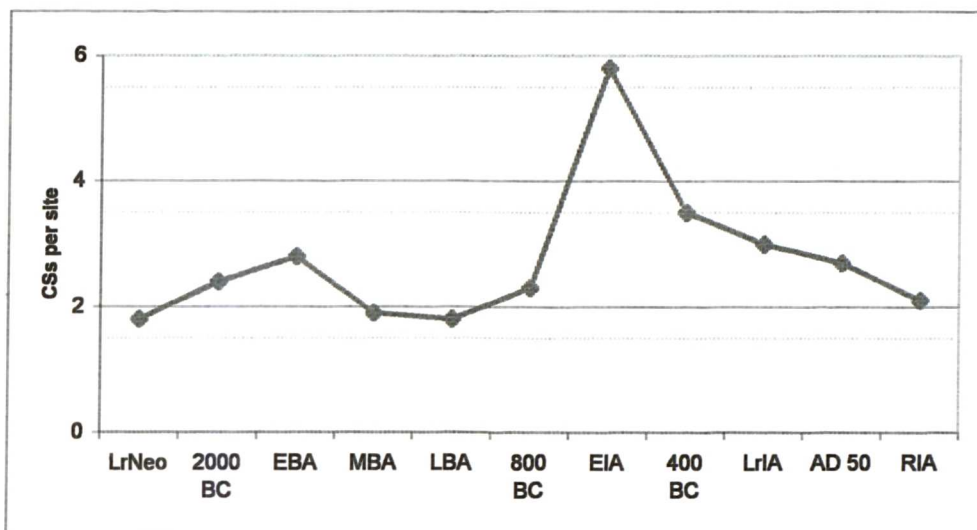


Fig 9.18 Number of circular structures per site: chronological breakdown

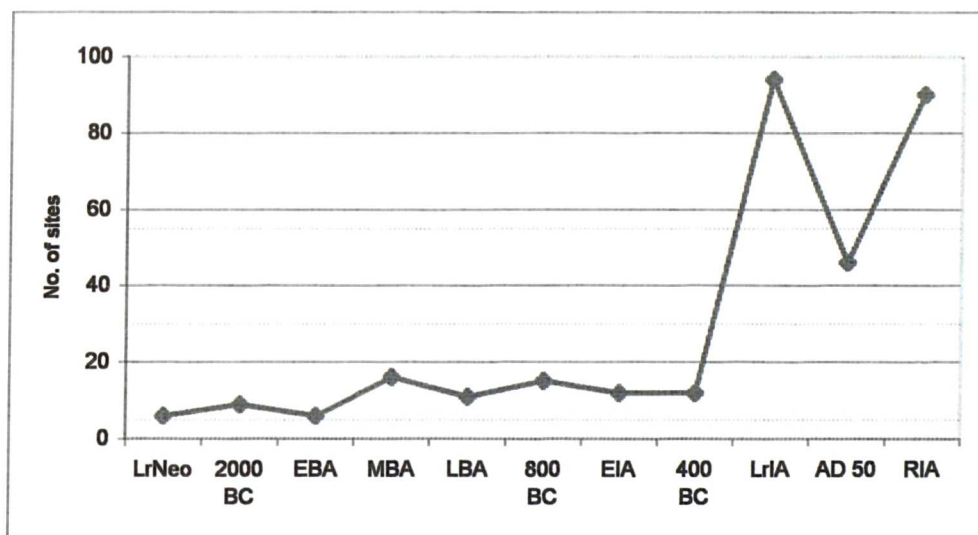


Fig 9.19 Number of sites: chronological breakdown

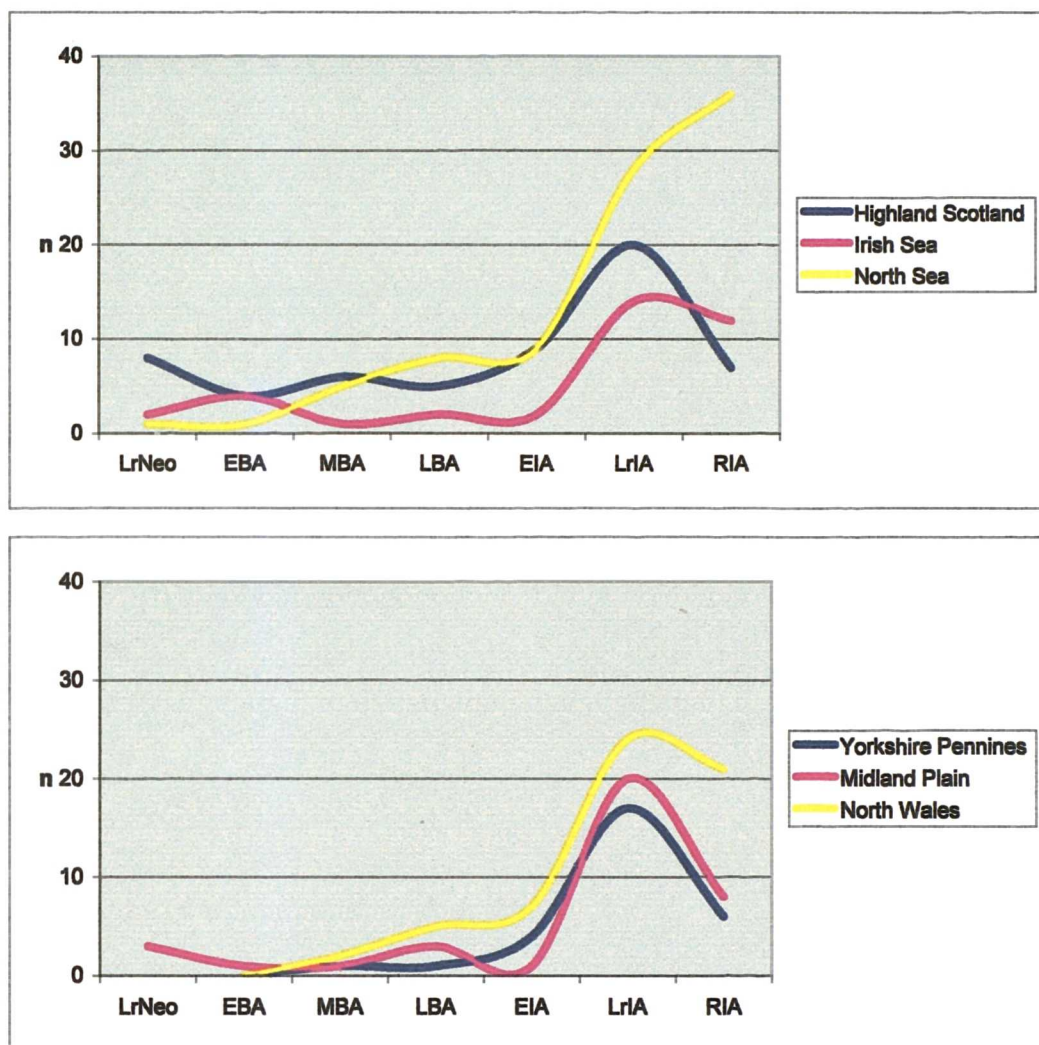


Fig 9.20 Regional and chronological breakdown of number of circular structures

Chapter 10 Conclusions

"To be content with one's comprehension of the archaeological data is to cease thinking about it"

(Reynolds 1983, 178)

As Crawford (1953) predicted, the architectural data has shown itself to be sensitive to social change. Major social change – as revealed by the domestic data – occurs during the MBA and during the period surrounding c. 800 BC. The MBA is a period of major innovation and economic growth, cut short during the LBA as larger, more economically diverse communities were unable to adapt to climate change in the way that their ancestors had done relatively successfully 1000 years earlier³¹. Whilst climate change was – without doubt – an important catalyst, the current research reveals that social change in prehistory was a result of the culmination of a number of processes with earlier origins. The work reveals that the 800 BC date for major social change – as given recently by Stuart Needham (forthcoming) – is valid at a national level. Other major conclusions include the fact that enclosure – and elaborate enclosure – has earlier origins than previously accepted in models from southern England. There is also evidence to suggest different origins for communities in the north and west of Britain and those in the south and east.

The study has provided a major work of synthesis on the character and roles of the prehistoric roundhouse. In addition, we now have a greater understanding of everyday life in prehistory, alongside a long-term view of prehistory. Regions in north and central Britain have been characterised, helping us to move away from focus on south central England. Methodologically, the thesis has successfully married various levels of interpretation, including the household, the household within the landscape, the wider community, the region, inter-regional contact and national-level narrative. An attempt has been made to engender later prehistory and to move away again from the inappropriate use of analogy, with a shift towards data-led interpretation and informed social narrative. With this work, prehistoric studies can move on from the study of modern institutions in the past such as status, or ritual as religion. Instead we can begin to study past human action: integrated and engendered; local and national; everyday life and social system.

The results of the study must now be integrated with evidence from other specialist fields in prehistoric studies – such as work on burial practices, monuments, metalwork deposition, palaeo-environmental studies, land allotment studies, climatology, and anthropological models of social behaviour – in order to clarify how different aspects of the prehistoric social systems worked alongside each other and how change occurs. There is also the need for a rash of local-

³¹ For up-to-date research on climate change in prehistory see Petit *et al.* (1999).

and regional-level studies to test both the patterns and the interpretations churned out by this larger scale analysis, where it has been necessary to focus on the general trends within naturally more diverse social groups. By testing the conclusions of this broad study, the risk of regional studies leading to fragmentation within the field - all too obvious in recent policy (cf. English Heritage 2000a) - is halted, as local and regional studies have a national relevance. Research on a similar scale must now be conducted for prehistoric settlement in southern Britain. Results must be compared with work in Ireland and on the continent to provide information on wider contacts.

There is need for further modelling of land-use. In particular collaborations must be sought with palaeo-environmentalists regarding the location of arable agriculture, pastoralist activities, and woodland management in the landscape. Crucial too is further work on seasonality, structure lifespans and use-life, formation processes, and in particular the circumstances surrounding site abandonment. Of particular importance is tackling questions regarding the formation of occupation soil. There is a need for greater scientific research on this topic including an experimental programme and investigating the possibility of close-dating abandonment using new techniques on fragments of burnt bone. Understanding patterns in abandonment is the key to prehistoric social systems. More work is also needed on the varying scales of prehistoric social interaction and this might be achieved via further adoption of work on small world networks and the concept of the transfer of ideas. Further work is also needed on the social mechanism that is the hilltop enclosure; through this we can re-address questions regarding group identity.

Within academia, the publication of the current dataset is an immediate priority, providing prehistoric studies with an integrated resource which will significantly cut research time. Ideally the dataset should be expanded to include both published and unpublished sites from across Britain. Ideas developed in the thesis regarding structure type must be tested with the continuation of Peter Reynolds' experimental research, targeted at specific academic questions. The work can be used to help bridge the gap between academia and the field with the production of a best-practice policy document for British roundhouse excavation and interpretation. One major unit has already requested a summary of the current study to guide their excavation strategy. Funding willing, the current author will produce a guidelines document in the near future. Such a document is now vital considering the rapid turnover and increasing scale in the excavation of prehistoric sites by developer-led archaeology. The results of this study also have the potential to reach a wider audience in the social sciences community as well as in the general public. In conclusion, it is hoped that this research has revealed new potential in the prehistoric dataset.

Appendix 1: Gazetteer of Sites

Highland Scotland			
Site	County	No. of CSs	References
Candle Stane	Aberdeenshire	1	Cameron (1997)
Deer's Den	Aberdeenshire	4	Alexander (1996a)
Greenbogs	Aberdeenshire	3	Greig (1996)
St. Fergus to Peterhead	Aberdeenshire	2	Strachan (1998)
Wardend	Aberdeenshire	4	Russell-White (1995)
Culhawk Hill	Angus	1	Rees (1998)
Dalladies	Angus	9	Watkins (1978-80a)
Douglasmuir	Angus	7	Kendrick (1982; 1995)
Dundee HTP	Angus	2	Gibson & Tavener (1989)
Hatton Mill Farm	Angus	1	DES (1993a)
Ironshill	Angus	2	Pollock (1997)
West Mains of Ethie	Angus	2	Wilson (1978-80)
Ardenraive	Argyll & Bute	2	Rennie (1997)
Ardnadam-Dunloskin	Argyll & Bute	4	Rennie (1997)
Ardnadam Glen	Argyll & Bute	2	Rennie (1984; 1999)
Auchategan	Argyll & Bute	2	Marshall (1977-78)
Balevullin	Argyll & Bute	1	MacKie (1963-64)
Balloch Hill	Argyll & Bute	8	Peltenburg (1982)
Barmore Wood	Argyll & Bute	1	Rennie (1997)
Cùl a'Bhaile	Argyll & Bute	3	Stevenson (1984)
Dippen	Argyll & Bute	1	Rennie (1997)
Dùn Cùl Bhuirg	Argyll & Bute	1	Ritchie & Lane (1978-80)
Gualachulain	Argyll & Bute	1	Rennie (1997)
Lephinchapel South	Argyll & Bute	1	Rennie (1997)
Macewen's Castle	Argyll & Bute	1	Marshall (1983)
Sorisdale	Argyll & Bute	1	Ritchie & Crawford (1977-78)
Taynish	Argyll & Bute	2	Rennie (1997)
Drumcarrow	Fife	1	Maxwell (1967-68)
Green Craig	Fife	1	Bersu (1947-48b)
Ormiston Farm	Fife	1	Sherriff (1988)
Scotstarvit Covert	Fife	3	Bersu (1947-48a)
Armadaile	Highland	1	Strachan (1996)
Cnoc Stanger	Highland	6	Mercer (1996)
Coille A'Ghasgain	Highland	1	DES (1994)
Cyderhall	Highland	2	Pollock (1992)
Delny	Highland	1	DES (1993b)
Kilearnan Hill	Highland	4	McIntyre (1998)
Kilphedir	Highland	7	Fairhurst & Taylor (1970-71)
Kinbrace	Highland	1	Curle (1910-11)
Lairg	Highland	7	McCullagh & Tipping (1998)
Loch Asgaig	Highland	1	Curle (1910-11)
Upper Suisgill	Highland	2	Barclay (1985)
Romancamp Gate	Moray	4	Barclay (1993)
Kilpatrick	North Ayrshire	1	Barber (1997)
Tormore	North Ayrshire	2	Barber (1997)
Aldclune 1	Perth & Kinross	2	Hingley <i>et al.</i> (1997)
Aldclune 2	Perth & Kinross	2	Hingley <i>et al.</i> (1997)
Carn Dubh	Perth & Kinross	7	Rideout (1995)
Craighead	Perth & Kinross	1	Rideout (1995)
Dalnaglar	Perth & Kinross	2	Stewart (1961-62)
Dalrulzion	Perth & Kinross	3	Thorneycroft (1932-33; 1945-46); Maxwell (1967-68)

Site	County	No. of CSs	References
Litigan	Perth & Kinross	1	Taylor (1990)
Newmill	Perth & Kinross	3	Watkins (1978-80b)
North Mains	Perth & Kinross	1	Barclay & Tolan (1990)
Queen's View	Perth & Kinross	1	Taylor (1990)
Bannockburn 1	Stirling	2	Rideout (1996)
Bannockburn 2	Stirling	4	Rideout (1996)
Fairy Knowe	Stirling	1	Main (1998)
Keir Hill	Stirling	1	Maclaren (1957-58)
Myrehead	Stirling	4	Barclay (1983)
West Plean	Stirling	2	Steer (1955-56)

Irish Sea Region			
Site	County	No. of CSs	References
Eller Beck	Cumbria	1	Lowndes (1964)
Fingland	Cumbria	1	Richardson (1977)
Hawk, The	Cumbria	1	Orrom (1971)
Penrith Farm	Cumbria	1	Higham & Jones (1983)
Wolsty Hall	Cumbria	1	Blake (1959)
Woodhead	Cumbria	1	Hodgson (1940)
Beckton Farm	Dumfries & Galloway	3	Pollard (1997)
Blairhall Burn	Dumfries & Galloway	2	Strachan <i>et al.</i> (1998)
Boonies	Dumfries & Galloway	13	Jobey (1972-74)
Burnswark Hill	Dumfries & Galloway	5	Jobey (1977-78)
Carronbridge	Dumfries & Galloway	5	Johnston (1994)
Cruggleton Castle	Dumfries & Galloway	1	Ewart (1985)
Hayknowes	Dumfries & Galloway	1	Gregory (1996)
Long Knowe	Dumfries & Galloway	15	Mercer (1981)
McNaughton's Fort	Dumfries & Galloway	1	Scott-Elliot <i>et al.</i> (1966)
Milton Loch	Dumfries & Galloway	1	Piggott (1952-53)
Moss Raploch 1	Dumfries & Galloway	1	Condry & Ansell (1977-78)
Rispain Camp	Dumfries & Galloway	2	Haggarty & Haggarty (1983)
Trusty's Hill	Dumfries & Galloway	1	Thomas (1961)
Uppercleugh	Dumfries & Galloway	1	Terry (1993b)
Whithorn	Dumfries & Galloway	1	Hill (1998)
Woodend Farm	Dumfries & Galloway	24	Banks (1995a)
Muirkirk	East Ayrshire	2	Baird (1913-14); Fairbairn (1926-27)
Picketlaw	East Renfrewshire	1	Alexander & Henry (1996)
Shiels Govan	Glasgow	1	Scott (1996)
Ballacagen Lough A	Isle of Man	5	Bersu (1977); Chiverrell (1999)
Ballacagen Lough B	Isle of Man	2	Bersu (1977); Chiverrell (1999)
Ballanicholas	Isle of Man	2	Gelling (1966-68)
Ballanorris	Isle of Man	3	Bersu (1977); Chiverrell (1999)
Close ny chollagh	Isle of Man	4	Gelling (1958)
Peel Castle	Isle of Man	2	Freke (1985)
Ronaldsway Village	Isle of Man	4	Neely (1940); Higgins (1999)
South Barrule	Isle of Man	3	Gelling (1960-63; 1970)
Lintshie Gutter	Lanarkshire	12	Terry (1995a)
Carwinning Hill	North Ayrshire	1	Cowie (1983)
Knapps	Renfrewshire	1	Alexander (1996b)
Knockmade Homestead	Renfrewshire	1	Livens (1996)
Walls Hill	Renfrewshire	2	Cowie (1983)
Bodsberry Hill	South Lanarkshire	2	Terry (1993a)

North Sea Region			
Site	County	No. of CSs	References
Catcote	Cleveland	6	Long (1988); Vyner & Daniels (1989)
Eston Nab	Cleveland	1	Vyner (1988)
Thorpe Thewles	Cleveland	21	Heslop (1987)
Bracken Rigg	Durham	1	Coggins & Fairless (1984)
Coxhoe	Durham	1	Haselgrove & Allon (1982)
Dubby Sike West	Durham	2	Coggins & Gidney (1988)
Forcegarth Pasture N	Durham	4	Fairless & Coggins (1980)
Forcegarth Pasture S	Durham	3	Fairless & Coggins (1986)
Old Durham	Durham	2	Wright & Gillam (1951)
West Brandon	Durham	3	Jobey (1962)
Broxmouth	East Lothian	13	Hill (1982a; 1982b)
Craig's Quarry	East Lothian	1	Piggott (1957-58)
Dryburn Bridge	East Lothian	11	Triscott (1982)
Haddington	East Lothian	1	Terry (1995b)
Inveresk	East Lothian	1	Keppie (1996)
Port Seton	East Lothian	4	Adams <i>et al.</i> (1996); Adams & Haselgrove (1995)
St. Germain's	East Lothian	4	Alexander & Watkins (1998)
Traprain Law	East Lothian	2	Cree (1922-23)
Camelon	Falkirk	2	Proudfoot (1977-78)
Braidwood Fort	Midlothian	2	Stevenson (1948-49); Piggott (1957-58)
Kaimes Hillfort	Midlothian	5	Childe (1940-41); Simpson (1969)
Melville Nurseries	Midlothian	2	Raisen & Rees (1994-95)
Belling Law	Northumberland	5	Jobey (1977)
Bridge House	Northumberland	5	Jobey (1960); Charlton & Day (1974)
Burradon	Northumberland	10	Jobey (1970)
Carry House Camp	Northumberland	4	Rome Hall (1880)
Chester House	Northumberland	3	Holbrook (1988); Holbrook & van der Veen (1995)
Corbridge	Northumberland	1	Richmond & Gillam (1955)
Doubstead	Northumberland	2	Jobey (1982)
Gowanburn River Camp	Northumberland	3	Jobey & Jobey (1988)
Greaves Ash A	Northumberland	2	Tate (1861)
Greaves Ash B	Northumberland	1	Tate (1861)
Greaves Ash C	Northumberland	1	Tate (1861)
Gubeon Cottage	Northumberland	5	Jobey (1957)
Hartburn	Northumberland	38	Jobey (1973a)
Hetha Burn 1	Northumberland	3	Burgess (1970)
High Knowes A	Northumberland	2	Jobey & Tait (1966)
High Knowes B	Northumberland	1	Jobey & Tait (1966)
Houseledge	Northumberland	1	Burgess (1981)
Huckhoe	Northumberland	3	Jobey (1959)
Kennel Hall Knowe	Northumberland	5	Jobey (1978)
Linhope Burn	Northumberland	2	Topping (1990-91)
Lookout Plantation	Northumberland	1	Monaghan (1994)
Middle Gunnar Peak	Northumberland	6	Jobey (1981)
Milking Gap	Northumberland	5	Kilbride-Jones (1938)
Murton High Craggs	Northumberland	25	Jobey & Jobey (1987)
Riding Wood	Northumberland	2	Jobey (1960)
Standrop Rigg	Northumberland	2	Jobey (1983)
Swint Law	Northumberland	2	Tate (1862)
Tower Knowe	Northumberland	7	Jobey (1973b)
West Gunnar Peak	Northumberland	6	Rome Hall (1884)
West Longlee	Northumberland	1	Jobey (1960)
West Whelpington	Northumberland	5	Jarrett & Evans (1989)

Site	County	No. of CSs	References
Witchy Neuk	Northumberland	2	Wake (1939)
Woolaw	Northumberland	2	Charlton & Day (1978)
Yeavinger Bell	Northumberland	4	Tate (1862)
Yeavinger Bell B	Northumberland	1	Tate (1862)
Yeavinger Bell C	Northumberland	1	Tate (1862)
Bonchester Hill	Scottish Borders	6	Curle (1909-10); Piggott (1949-50)
Candyburn	Scottish Borders	1	Lane (1986)
Crock Cleuch East	Scottish Borders	1	Steer & Keeney (1946-47)
Crock Cleuch West	Scottish Borders	1	Steer & Keeney (1946-47)
Dod, The	Scottish Borders	14	Smith & Taylor (2000)
Dunion, The	Scottish Borders	14	Rideout (1992)
Edin's Hall	Scottish Borders	7	Turnbull (1879)
Eildon Hill North	Scottish Borders	2	Owen (1992)
Glenachan Rig	Scottish Borders	1	Feachem (1958-59)
Green Knowe	Scottish Borders	6	Feachem (1960-61); Jobey (1978-80)
Hangingshaw	Scottish Borders	1	Marshall (1967-68)
Harehope	Scottish Borders	4	Feachem (1959-60)
Hayhope Knowe	Scottish Borders	3	Piggott (1948-49); HSG (1987)
Hownam Rings	Scottish Borders	2	Piggott (1947-48)
Meldon Bridge	Scottish Borders	1	Burgess (1976)
Torwoodlee	Scottish Borders	1	S. Piggott (1950-51)
Marden	Tyne & Wear	1	Jobey (1963)
South Shields	Tyne & Wear	1	Hodgson (1994; Unpublished)
Tynemouth Priory	Tyne & Wear	4	Jobey (1967)

Yorkshire Pennines			
Site	County	No. of CSs	References
Beeley Moor	Derbyshire	1	Radley (1965)
Mam Tor	Derbyshire	9	Coombs & Thompson (1979)
Swarkestone Lowes	Derbyshire	2	Elliott & Knight (1999); Guilbert & Elliott (1999)
Swine Sty	Derbyshire	1	Machin (1971-79)
Bursea Grange	East Yorks.	1	Halkon & Millett (1999)
Garton Wetwang	East Yorks.	79	Brewster (1976); Dent (1983)
Hayton	East Yorks.	2	Esmonde Cleary (1997); Halkon & Millett (1996)
Heslerton	East Yorks.	6	Powlesland (1986)
Melton	East Yorks.	2	Bishop (1999)
Thwing	East Yorks.	1	Manby (1980; 1985)
Welton Wold	East Yorks.	1	Mackey (1998)
Cat Babbleton Farm	North Yorks.	1	Cardwell (1989)
Catterick Race Course	North Yorks.	8	Moloney (1996)
Crag Bank	North Yorks.	1	Close <i>et al.</i> (1975)
Crossgates	North Yorks.	1	Rutter & Duke (1958)
Great Ayton Moor	North Yorks.	1	Tinkler & Spratt (1978)
Holme House	North Yorks.	2	Harding (1984)
Levisham Moor B	North Yorks.	2	Hayes (1983)
Levisham Moor D	North Yorks.	1	Hayes (1983)
Lingcroft Farm	North Yorks.	5	Jones (1988)
Melsonby	North Yorks.	2	Fitts <i>et al.</i> (1999)
Percy Rigg	North Yorks.	5	Close (1972)
Rock Castle	North Yorks.	3	Fitts <i>et al.</i> (1994)
Roxby	North Yorks.	6	Inman <i>et al.</i> (1985)
Scotch Corner	North Yorks.	2	Abramson (1995)
Staple Howe	North Yorks.	2	Brewster (1963)
The Tofts, Stanwick	North Yorks.	10	Haselgrove <i>et al.</i> (1989; 1990); Wheeler (1954)
Thormanby	North Yorks.	1	Hayes (1965)
Dalton Parlours	West Yorks.	9	Sumpter (1988); Wrathmell & Nicholson (1990)
Pickburn Leys	South Yorks.	2	Cumberpatch (1992-93)
Penigent Gill	Yorkshire	2	'W.B.' (1938-39)

Midland Plain			
Site	County	No. of CSs	References
Arthill Heath Farm	Cheshire	2	Nevell (1987)
Castle Ditch	Cheshire	1	Varley (1950); Cocroft <i>et al.</i> (1989)
Great Woolden	Cheshire	3	Nevell (1987-88)
Tatton Park	Cheshire	3	Higham (1984-85)
Aylesby	Humberside	2	Steedman & Foreman (1995)
Shiptonthorpe	?Humberside	1	Frere (1991; 1992)
Enderby I	Leicestershire	4	Clay (1992)
Enderby II	Leicestershire	6	Sharman & Clay (1991); Meek (1997)
Kirby Muxloe 1	Leicestershire	3	Cooper (1994)
Kirby Muxloe 2	Leicestershire	4	Cooper (1994)
Normanton-le-Heath	Leicestershire	2	Thorpe <i>et al.</i> (1994)
Oadby	Leicestershire	1	Ripper (1997)
Wanlip	Leicestershire	1	Beamish (1998)
Colsterworth	Lincolnshire	9	Grimes (1958)
Dragonby, Site 1	Lincolnshire	9	May (1996; pers. comm.)
Dragonby, Site 2	Lincolnshire	1	May (1996)
Weelsby Avenue	Lincolnshire	1	Sills & Kingsley (1979; 1990)
Garnston	Nottinghamshire	2	Knight (1992)
Glebe Farm	Nottinghamshire	1	Thompson (1951)
Gonalston	Nottinghamshire	2	Elliott & Knight (1996)
Mansfield Woodhouse	Nottinghamshire	2	Oswald (1949)
Rampton	Nottinghamshire	3	Ponsford (1992)
Scratta Wood	Nottinghamshire	3	Challis & Harding (1975)
Stanton-on-the-Wolds	Nottinghamshire	1	Bird & Bird (1972)
Staunton 1	Nottinghamshire	3	Todd (1975)
Staunton 2	Nottinghamshire	1	Todd (1975)
Fatholme	Staffordshire	1	Trent & Peak Archaeological Trust (1985)
Fisherwick [1]	Staffordshire	2	Miles (1968-9)
Fisherwick [2]	Staffordshire	2	Smith (1974-5)
Fisherwick [3]	Staffordshire	2	Smith (1979)
Church Lawford	Warwickshire	2	Palmer (1994)
Coleshill	Warwickshire	5	Magilton (1980)
Coton Park	Warwickshire	39	Chapman (1998)

North Wales			
Site	County	No. of CSs	References
Bodafon Mountain A	Anglesey	1	Griffiths (1955)
Bryn Eryr	Anglesey	3	Longley (1988); Longley <i>et al.</i> (1998)
Din Lligwy	Anglesey	3	Baynes (1908; 1930)
Pant-y-Saer	Anglesey	2	Phillips (1934)
Parc Dinmor	Anglesey	1	Phillips (1932)
Porth Dafarch	Anglesey	3	O'Neil (1940)
Ty Mawr	Anglesey	14	Smith (1985; 1986)
Caer Cadwgan	Ceredigion	2	Austin <i>et al.</i> (1990)
Braich y Dinas	Conwy	32	Hughes (1912; 1915; 1922)
Dinas	Conwy	1	Hughes & Bezant Lowe (1925)
Dinorben	Conwy	15	Savory (1959; 1971) Gardner & Savory (1964); Guilbert (1979)
Foel Dduarth	Conwy	2	Bezant Lowe (1912)
Foel Lwyd	Conwy	1	Bezant Lowe (1912)
Gwern Engan	Conwy	5	Bezant Lowe (1912)
Brenig 48	?Denbighshire	1	Lynch (1993)
Brenig 6	?Denbighshire	1	Lynch (1993)
Moel Hiraddug	Denbighshire	6	Houlder (1961); Brassil (1979; 1980); Brassil <i>et al.</i> (1981)
Prestatyn	Denbighshire	3	Blockley (1989)
Moel y Gaer	Flintshire	37	Guilbert (1975a; 1975b; 1976)
Braich y Cornel	Gwynedd	3	Gresham (1972)
Brithdir	Gwynedd	1	Longley (1991)
Bryn y Castell	Gwynedd	3	Crew (1983; 1984; 1985)
Bush Farm	Gwynedd	2	Longley <i>et al.</i> (1998)
Caer'r Mynydd	Gwynedd	4	Griffiths (1959a)
Caerau I	Gwynedd	3	O'Neil (1936)
Caerau II	Gwynedd	1	O'Neil (1936)
Castell Odo	Gwynedd	12	Breese (1932); Alcock (1960); Kelly (1988a)
Cefn Graeanog	Gwynedd	5	Goodburn (1978)
Coed-y-Brain	Gwynedd	3	Williams (1923)
Conway Mountain	Gwynedd	5	Griffiths & Hogg (1956)
Cors-y-gedol	Gwynedd	2	Griffiths (1959b)
Crawcwellt West	Gwynedd	12	Crew (1989a; 1989b; 1991; 1998)
Dinas Emrys	Gwynedd	1	Savory (1960)
Erw-wen	Gwynedd	3	Kelly (1988a)
Garn Boduan	Gwynedd	5	Hogg (1960)
Graeanog	Gwynedd	2	Hogg (1969a)
Graeanog Homestead	Gwynedd	3	Kelly (1988b)
Hafod-y-Celyn	Gwynedd	1	Bezant Lowe (1924)
Llandegai	Gwynedd	5	Musson (1970b)
Llwyn-du Bach	Gwynedd	3	Bersu & Griffiths (1948-49)
Moel y Gerddi	Gwynedd	2	Kelly (1988a)
Tre'r Ceiri	Gwynedd	4	Hogg (1960)
Breiddin	Powys	25	O'Neil (1937); Musson (1976); Musson <i>et al.</i> (1991)
Breiddin, New Pieces	Powys	1	O'Neil (1937)
Caersws	Powys	1	Daniels <i>et al.</i> (1969-70)
Collfryn	Powys	12	Britnell (1982); Britnell <i>et al.</i> (1989)
Glanfeinion	Powys	1	Britnell <i>et al.</i> (1997)
Caynham Camp	Shropshire	2	Gelling (1962-63)
Old Oswestry	Shropshire	4	Hughes (1994)
Sharpstones Hill A	Shropshire	2	Barker <i>et al.</i> (1991)
Sharpstones Hill E	Shropshire	1	Barker <i>et al.</i> (1991)
Wall Camp	Shropshire	1	Bond (1991)

Appendix 2: Rennie (1997)

Rennie's (1997) Early Medieval dates are disputed. It is assumed that the C-14 dates have been contaminated by the attested reuse of platforms for charcoal-burning activities in the 2nd millennium AD. In discussing the Taynish platform, Rennie states: "As at Lephinchapel and Gualachulain, the [apparently 18th century AD] colliers have cleaned off the top turf and soil to reveal the stone floor; they have then levelled it up where it was broken and used it many times for charring" (Rennie 1997, 164). A situation bound to cause contamination of C-14 dates. Four platforms produced Early Medieval C-14 dates from unsealed contexts (rear wall-slots), these four platforms all suffered a period of reuse, three as charcoal-burning hearths, dating - according to Rennie - in the 18th century AD. The platform that *did* produce a prehistoric (Neolithic) C-14 date (Ardnadam-Dunloskin Plat 9 Ph.1) was protected by an earlier period of reuse (assumed by Rennie to be Dark Ages/Early Medieval but based only on depth of soil accumulation between it and the later, apparently 18th century AD, phase of reuse). Rennie's 18th century AD date appears to be assumed, based on documentary accounts, and is never proven archaeologically (and, in fact, 13th/14th century AD pottery was recovered from the floor of Ardnadam-Dunloskin Plat 9) so the reuse of the platforms could date to the Early Medieval period which would, therefore, explain the C-14 dates. Taking into account the possible effects of worm action and soil filtration, sufficient doubt exists to justify the rejection of Rennie's dates and as a result a more general 'Nco/BA' date has been attributed to the structures.

Appendix 3: Finds Context

		Constructed Deposition		Structural Feature Fills		Non-Structural Feature Fills		Horizontal Interface		Hearth		Occ. Deposits		Decay Deposits		Total	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Subsistence	Vessels	33	19	61	25	79	23	98	16	44	16	68	22	2	7	385	19
	Fineware	3	2	1	0	15	4	20	3	6	2	5	2	0	0	50	3
	VCP	0	4	5	2	4	1	5	1	0	0	5	2	1	3	20	1
	Bone	7	1	28	11	29	8	45	7	22	8	32	11	2	7	165	8
	Shell	2	1	1	0	1	0	8	1	3	1	5	2	0	0	21	1
	Plant Remains	8	5	12	5	17	5	3	0	4	1	10	3	0	0	54	3
	Quernstones	16	9	21	9	38	11	54	9	25	9	19	6	2	7	175	9
	Rs & Ps	9	5	14	6	24	7	43	7	18	6	15	5	2	7	125	6
	Pot-Boilers	11	6	14	6	13	4	30	5	16	5	7	2	3	10	94	5
	Arrowheads	0	0	3	1	5	1	4	1	3	1	3	1	2	7	20	1
Textiles	Spindlewhorls	6	3	5	2	3	1	22	4	12	4	13	4	5	17	66	3
	Weaving Equipmt.	3	2	4	2	5	1	8	1	6	2	3	1	3	10	32	2
	Sewing Equipmt.	0	0	1	0	1	0	1	0	0	0	1	0	0	0	4	0
Craftworking	Flint	9	5	17	7	19	5	29	5	16	5	22	7	1	3	113	6
	Bone & Antler	0	0	2	1	1	0	2	0	2	1	5	2	0	0	12	1
	Cannel Coal	1	1	1	0	2	1	2	0	3	1	2	1	1	3	12	1
	Glass	1	1	1	0	2	1	3	0	2	1	6	2	0	0	15	1
	Tools	7	4	4	2	9	3	16	3	10	4	11	4	0	0	57	3
	Hones	8	5	5	2	6	2	25	4	7	3	3	1	1	3	55	3
	Other Equipment	3	2	3	1	4	1	14	2	3	1	4	1	2	7	33	2
Metalworking	Smelting	2	1	5	2	7	2	7	1	1	0	3	1	0	0	25	1
	Smithing	0	0	6	2	7	2	5	1	4	1	1	0	1	3	24	1
	Undiagnostic Fe-working	5	3	3	1	8	2	13	2	10	4	8	3	0	0	47	2
	Non-Ferrous Metalworking	5	3	2	1	10	3	17	3	11	4	13	4	0	0	58	3
Display	Clothes Fasteners	6	3	0	0	3	1	15	2	7	3	4	1	0	0	35	2
	Jewellery	8	5	11	4	16	5	48	8	15	5	16	5	1	3	115	6
	Coins	2	1	1	0	1	0	2	0	3	1	1	0	0	0	10	1
	Weapons	1	1	2	1	1	0	3	0	4	1	1	0	0	0	12	1
	Prestige Goods	3	2	2	1	9	3	26	4	9	3	7	2	0	0	56	3
Other Finds	Lamps	0	0	2	1	1	0	2	0	1	0	2	1	1	3	9	0
	Fixtures/Fittings	5	3	0	0	1	0	15	2	4	1	4	1	0	0	29	1
	Cup-Marked Stones	2	1	5	2	4	1	6	1	2	1	3	1	0	0	22	1
	Holed Stones	5	3	1	0	4	1	5	1	2	1	0	0	0	0	17	1
	Games & Curios	3	2	1	0	0	0	6	1	3	1	0	0	0	0	13	1
	Deposited Bone	0	0	0	0	1	0	1	0	1	0	1	0	0	0	4	0
	Other (e.g. hobnails)	1	1	1	0	1	0	3	0	1	0	0	0	0	0	7	0
Grand Total																1991	

Appendix 4: Odd Deposits

4.1 'Odd deposits' included in feature packing

Site	CS	Region	Period	Description	Reference
Tormore	10/1	Highland	EBA	Saddle quern	Barber 1997
Upper Suisgill	1A/1B	Highland	LBA	Saddle quern	Barclay 1985
Carn Dubh	5	Highland	LBA	Hammerstone	Rideout 1995
Melville Nurseries	Unencl.	North Sea	EIA	Saddle quern fragments	Raisen & Rees 1994-95
Ballacagen Lough B	Ph.I	Irish Sea	LrIA	Stone axe	Bersu 1977
Belling Law	1	North Sea	LrIA	Rotary quern	Jobey 1977
Dalton Parlours	R7	Yorkshire	LrIA	Beehive quern lower stones	Wrathmell & Nicholson 1990
Hartburn	12	North Sea	LrIA	Saddle quern	Jobey 1973a
Kennel Hall Knowe	1	North Sea	LrIA	Rotary quern	Jobey 1978
Ironshill	1	Highland	LrIA-RIA	Rotary quern fragments	Pollock 1997
West Whelpington	IIa	North Sea	LrIA-RIA	Rotary quern	Jarrett & Evans 1989
Boonies	10	Irish Sea	RIA	Rotary quern	Jobey 1972-74
Keir Hill	1	Highland	RIA	Perforated hourglass loomweight; fragments of Roman glass	MacIaren 1957-58

4.2 'Odd deposits' included in walls

Site	CS	Region	Period	Description	Reference
Tormore	10/4	Highland	BA	Flint flakes, cores, tools	Barber 1997
Blacken Rigg	1	North Sea	MBA	Jet pendant	Coggins & Fairless 1984
Lairg	6	Highland	MBA	Potsherd	McCullagh & Tipping 1998
Garn Boduan	150	N Wales	IA	Rubber, slingstone	Hogg 1960
Llwyn-du Bach	Central	N Wales	IA	Saddle quern	Bersu & Griffiths 1948-49
Traprain Law	P level 4	North Sea	IA	Saddle quern	Cree 1922-23
Bonchester Hill	III	North Sea	LrIA	LT I brooch	Curlie 1909-10
Dubby Sike W	GH	North Sea	LrIA	Flint core	Coggins & Gidney 1988
Kaimes Hillfort	1	North Sea	LrIA	Rubbers	Simpson 1969
Aldclune 2	Ph.2	Highland	LrIA-RIA	Potsherds; rotary quern; rubber; cup-marked stone	Hingley <i>et al.</i> 1997
Dod, The	A VI Pd.IV	North Sea	LrIA-RIA	Potsherd; rotary quern; iron reaping hook; stone lamp; ?loomweight	Smith & Taylor 2000
Dunion, The	61/1	North Sea	LrIA-RIA	Stone lamp fragment	Rideout 1992
Bridge House	4 (stone)	North Sea	RIA	Potsherds; rotary querns; coin	Charlton & Day 1974
Bridge House	2	North Sea	RIA	Potsherds; rotary querns; glass counter	Jobey 1960
Caerau I	IA	N Wales	RIA	Potsherds; rotary quern fragments; Fe slag; bronze sheet	O'Neil 1936
Carry House Camp	II	North Sea	RIA	Rotary quern	Rome Hall 1880
Castell Odo	10	N Wales	RIA	Saddle quern	Alcock 1960
Crock Cleuch East	E1	North Sea	RIA	Querns	Stear & Keeney 1946-47
Crossgates	4	Yorkshire	RIA	Querns; coin	Rutter & Duke 1958
Fingland	1	Irish Sea	RIA	Tile	Richardson 1977
Forcegarth Pasture N	G	North Sea	RIA	3 pounders; hone	Fairless & Coggins 1980
Forcegarth Pasture N	K	North Sea	RIA	Pounder, pot-boilers, hone	Fairless & Coggins 1980
Forcegarth Pasture N	C	North Sea	RIA	Pounder, pot lid; hone	Fairless & Coggins 1980
Forcegarth Pasture S	C Ph.2	North Sea	RIA	Miniature saddle quern; samian; 19 hones	Fairless & Coggins 1986
High Knowes B	A1	North Sea	RIA	Potsherds	Jobey & Tait 1966
Hownam Rings	2	North Sea	RIA	Bronze nail-cleaner	Piggott 1947-48
Huckhoe	1	North Sea	RIA	Potsherds	Jobey 1959
Huckhoe	2	North Sea	RIA	Potsherds; rotary quern fragments	Jobey 1959
Middle Gunnar Peak	5	North Sea	RIA	Half a stone whorl; 2 fragments of glass bangle	Jobey 1981
Thormanby	1	Yorkshire	RIA	Potsherds	Hayes 1965
Tower Knowe	A	North Sea	RIA	Cooking pot	Jobey 1973b
Tower Knowe	B	North Sea	RIA	Rotary quern	Jobey 1973b
Woolaw	2 Ph.2	North Sea	RIA	Rotary quern fragments	Charlton & Day 1978

4.3 'Odd deposits' in structural feature fills

Site	CS	Region	Period	Description	Reference
Green Knowe	2.2	North Sea	MBA	?lignite ring; saddle quern; cup-marked stone	Jobey 1978-80
Green Knowe	2.3	North Sea	MBA	Lignite ring; cup-marked stone	Jobey 1978-80
Lookout Platform	1	North Sea	MBA	Pot; polished stone axe	Monaghan 1994
Eildon Hill North	Plat. 3	North Sea	LBA	Pounder; quern rubber	Owen 1992
Myrehead	2	Highland	LBA-EIA	Quern fragments; sherds; wheat &/or barley	Barclay 1983
Myrehead	3	Highland	LBA-EIA	Jet bead; potsherds; burnt bone; wheat & barley	Barclay 1983
Bannockburn 2	H1	Highland	EIA	Pot; burnt bone; slag & clinker; worked stone	Rideout 1996
Burradon	4	North Sea	EIA	Saddle quern	Jobey 1970
Hayhope Knowe	7	North Sea	IA	Lge. no. potsherds; clay whorl; iron spearhead	Piggott 1948-49
Breiddin	R1	N Wales	EIA-LrIA	?clay loomweight	Musson <i>et al.</i> 1991
Breiddin	R8	N Wales	EIA-LrIA	Saddle quern; briquetage	Musson <i>et al.</i> 1991
Breiddin	R9	N Wales	EIA-LrIA	Stone whorl; piece of lead	Musson <i>et al.</i> 1991
Dalton Parlours	R1	Yorkshire	EIA-LrIA	3 beehive quern upper stones	Wrathmell & Nicholson 1990
Dalton Parlours	R3	Yorkshire	EIA-LrIA	Beehive quern upper stone	Wrathmell & Nicholson 1990
Dod, The	A VI Pd.I	North Sea	LrIA	Bovine molar	Smith & Taylor 2000
Dod, The	A XVI	North Sea	LrIA	Lamp	Smith & Taylor 2000
Enderby 1	2.1	Lowland	LrIA	Pot; bone; bone needle; blue glass bead	Sharman & Clay 1991; Meek 1997
Roman Camp Gate	A	Highland	LrIA	Quern	Barclay 1993
St. Germain's	RG2	North Sea	LrIA	Stone ball ?gaming piece	Alexander & Watkins 1998
St. Germain's	RG3	North Sea	LrIA	Grinder	Alexander & Watkins 1998
Catcote	1	North Sea	LrIA-RIA	Pot; rotary quern; stone pot-lid; 2 bone weaving combs; bone ring; antler gouge; bone implement; hone	Long 1988
Hartburn	25	North Sea	LrIA-RIA	Sherds; at least 7 ox teeth	Jobey 1973a
Kennel Hall Knowe	3	North Sea	LrIA-RIA	Large iron ring	Jobey 1978
Hartburn	4	North Sea	RIA	Sherds; saddle quern; ox teeth	Jobey 1973a
Roxby	1 Ph.1	Yorkshire	RIA	Beehive quern	Inman <i>et al.</i> 1985

4.4 'Odd deposits' in hearths

Site	CS	Region	Period	Description	Reference
Dinorben	18	N. Wales	LBA	Bone; burnt organic material; stone whorl; perforated antler object and handle	Savory 1971
Dragonby 1	3	Lowland	LrIA	Coin; 6 sherds of pottery	May 1996, 218
Crag Bank	-	Yorkshire	LrIA-RIA	Rotary quernstone; pottery; bead	Close <i>et al.</i> 1975
Ballanicholas	Later	Irish Sea	RIA	Penannular brooch	Gelling 1966-68
Moss Raploch 1	1	Irish Sea	RIA	Fragment of bone with incised cross-hatching amongst small stones	Condry & Ansell 1977-78, 109
Burradon	Central	North Sea	RIA	Teeth & bones of sheep/goat	Jobey 1970, 85
Carry House Camp	1	North Sea	RIA	A bundle of iron spearheads and 3 knives or daggers	Rome Hall 1880, 360

4.5 'Odd deposits' on floors (continued overleaf)

Site	CS	Region	Period	Description	Reference
Woodhead	-	Irish Sea	BA	Jet ring & button	Hodgson 1940
Carn Dubh	4	Highland	MBA	Iron gourge	Rideout 1995
Pant-y-Saer	W	N. Wales	BA/IA	Thin bronze disc; quernstone; potsherds; shells; slate discs; 8 hammerstones; 5 hones	Phillips 1934
Conway Mountain	1	N. Wales	IA	612 slingstones	Griffiths & Hogg 1956
Murton High Crags	T12	North Sea	IA	Shale ring	Jobey & Jobey 1987
Bonchester Hill	III	North Sea	EIA-LrIA	Blue bead	Curle 1909-10
Craig's Quarry	1	North Sea	EIA-LrIA	Hone; antler whorl; LT II brooch; shale ring & armlet; worked antler	Piggott 1957-58
Staple Howe	I	Yorkshire	EIA-LrIA	Whorl; jet find; bronze objects	Brewster 1963
Staple Howe	II	Yorkshire	EIA-LrIA	Jet ornaments; bone pins; lamp; splintered bone; potsherds; whorls	Brewster 1963
Tre'r Ceiri	29	N. Wales	LrIA	Fragment of shale ring; burnt bone	Hogg 1960
Ballacagen Lough A	1	Irish Sea	LrIA	3 bits of prismatic granite	Bersu 1977
Bodsberry Hill	1 Ph. 2	Irish Sea	LrIA	Shale bracelet	Terry 1993a
Crawcwellt West	A Ph. 3	N. Wales	LrIA	Glass bangle; coarse stone tools	Crew 1989a
Dunion, The	1 Ph. 2	North Sea	LrIA	Glass bead	Rideout 1992
Hangingshaw	1	North Sea	LrIA	2 bronze rings	Marshall 1967-68
South Shields	-	North Sea	LrIA	Basket of grain	Hodgson <i>et al.</i> 2001
Aldclune 2	Ph 2	Highland	LrIA-RIA	Bronze boss & sheet; iron blade & ring; lump of slag; cup-marked stone; 2 perforated stones	Hingley <i>et al.</i> 1997
Dunion, The	62/2	North Sea	LrIA-RIA	2 small stone balls; potsherds; burnt bone; flint flake	Rideout 1992
Balloch Hill	2	Highland	RIA	Lignite bead	Peitenburg 1982
Bridge House	1	North Sea	RIA	Glass bead; thin lead disc; iron nails	Jobey 1960
Bridge House	2	North Sea	RIA	Coin; iron nails	Jobey 1960
Bridge House	3	North Sea	RIA	Glass pendant; iron nails	Jobey 1960
Burnswark Hill	B3	Irish Sea	RIA	3 hones; lead ingot; glass bangle	Jobey 1977-78
Caersws	-	N. Wales	RIA	6 small lead weights	Daniels 1969-70
Camelon	1 & 2	North Sea	RIA	Bronze thong tag; potsherds; 2 gaming pieces	Proudfoot 1977-78
Carry House Camp	1	North Sea	RIA	Bronze horse-fitting	Rome Hall 1880

4.5 continued

Site	CS	Region	Period	Description	Reference
Coed-y-Brain	1	N. Wales	RIA	Olla sherd; perforated hone; blue glass bead	Williams 1923
Crock Cleugh East	1	North Sea	RIA	Bronze brooch; stone axe; potsherds	Steer & Keeney 1946-47
Din Lligwy	3	N. Wales	RIA	Many food processing artefacts; stag's horn; whorl; pounder; slag; slate; stone 'palette'; coin; iron eye and points; shells; teeth &/or bones of deer, cattle, horse, sheep/goat, & pig; 1 dog bone; 1 bird bone; 1 joint of a fish vertebrae	Baynes 1908
Eildon Hill North	1 Ph. 2	North Sea	RIA	Armlet; 2 fibulae; bronze sheet; bronzeworking debris; potsherds; pounder; 2 hammerstones; hone; flint flake	Owen 1992
Forcegarth Pasture North	C	North Sea	RIA	Potsherds; bronze button	Fairless & Coggins 1980
Forcegarth Pasture South	A	North Sea	RIA	Stone 'figurine' or gaming piece	Fairless & Coggins 1986
Hownam Rings	2	North Sea	RIA	Glass armlet; glassy slag; potsherds	Piggott 1947-48
Keir Hill	1	Highland	RIA	Hourglass loomweight; jet armlet; blue glass bead	MacIaren 1957-58
Milking Gap	1	North Sea	RIA	2 glass armlet fragments; samian; iron nails	Kilbride-Jones 1938
Milking Gap	2	North Sea	RIA	Dragonesque fibula; lead weight; 2 hobnails; potsherds; flint blade; bottle glass	Kilbride-Jones 1938
Milking Gap	3	North Sea	RIA	Green bottle glass; glass armlet; potsherds; samian	Kilbride-Jones 1938
Milking Gap	4	North Sea	RIA	2 glass bead fragments; potsherds; samian	Kilbride-Jones 1938
Milking Gap	5	North Sea	RIA	2 glass armlet fragments; burnt flint arrowhead; scraper; iron nail	Kilbride-Jones 1938
Milton Loch I	-	Irish Sea	RIA	Bronze & enamel loop; whorl; 2 bird-catching gorges	Piggott 1952-53
Moss Raploch 1	1	Irish Sea	RIA	Glass ring fragment	Condry & Ansell 1977-78
Old Durham	NW	North Sea	RIA	Thin bronze disc; strip of lead	Wright & Gillam 1951
West Gunnar Peak	I	North Sea	RIA	Iron armlet & ring; piece of lead; iron nail; quernstone; bones; potsherds; pot-boilers; pounder; hones	Rome Hall 1884
West Gunnar Peak	V	North Sea	RIA	Small horse tooth; small deer tooth; pot base; amphorae sherds	Rome Hall 1884
West Longlee	1	North Sea	RIA	Glass pendant; haematite nodule; iron nails; flagon base; cooking-pot base; whorl	Jobey 1960

4.6 'Odd deposits' in pit fills

Site	CS	Region	Period	Description	Reference(s)
Blairhall Burn	S1	Irish Sea	EBA	Potsherds; flint scraper, 'napkin ring'; saddle quern	Strachan <i>et al.</i> . 1998
Green Knowe	2.2	North Sea	EBA	Potsherds; 2 hones	Jobey 1978-80
Lairg	1	Highland	EBA	Potsherds; plant remains; saddle quern	McCullagh & Tipping 1998
Blairhall Burn	S2	Irish Sea	MBA	3 chert flakes; burnt barley	Strachan <i>et al.</i> . 1998
Myrehead	2	Highland	LBA-EIA	Potsherd; plant remains; 2 saddle querns; rubber	Barclay 1983
Pant-y-Saer	W	N. Wales	BA/IA	Full of bones	Phillips 1934
Douglasmuir	4	Highland	EIA	Plant remains; stone blade; hammerstone; saddle quern	Kendrick 1982; 1995
Douglasmuir	6	Highland	EIA	Plant remains	Kendrick 1982; 1995
Douglasmuir	9/C3	Highland	EIA	Plant remains	Kendrick 1982; 1995
Erw-wen	Stone	N. Wales	EIA	Saddle querns; pounders	Kelly 1988a
Balevullin	1	Highland	EIA/LrIA	Comb; animal burial	MacKie 1963-64
Aldclune 2	Ph. 1	Highland	LrIA	Burnt bone; flint; perforated stone disc; slag	Hingley <i>et al.</i> . 1997
Dunion, The	2 Ph. 1	North Sea	LrIA	Inverted beehive quern	Rideout 1992
West Brandon	A	North Sea	LrIA	Saddle quern	Jobey 1962
Aldclune 2	Ph. 2	Highland	LrIA-RIA	Hone; slag	Hingley <i>et al.</i> . 1997
Belling Law	1-4	North Sea	LrIA-RIA	2 small bar moulds	Jobey 1977
Bridge House	2	North Sea	RIA	Burnt bone; rotary quern	Jobey 1960
Cors-y-gedol	1	N. Wales	RIA	Fragments of an oak bowl	Griffiths 1959b

4.7 'Odd deposits' in drainage gully fills

Site	CS	Region	Period	Description	Reference
Glanfeinion	1	N. Wales	MBA	Potsherds; burnt bone; fired clay; saddle quern & rubber	Britnell <i>et al.</i> . 1997
Port Seton	4	North Sea	LBA-EIA	Animal bones	Adams & Haselgrove 1995
Burradon	4	North Sea	EIA	Saddle quern on base	Jobey 1970
Swarkestone Lowes	F24	Yorkshire	IA	Potsherds; saddle quern	Elliot & Knight 1999
Collifryn	8	N. Wales	LrIA	Briquetage; beehive quern; mould fragment	Britnell <i>et al.</i> . 1989
Collifryn	9	N. Wales	LrIA	Whorl; 9 bronze crucible fragments	Britnell <i>et al.</i> . 1989
Crawcwellt West	J5 Ph. 1	N. Wales	LrIA	Slate ring; pendant	Crew 1998
Dod, The	A VI Pd 1	North Sea	LrIA	2 potsherds; smithing debris; lamp	Smith & Taylor 2000
Enderby I	2.1	Lowland	LrIA	Blue glass bead	Clay 1992
Enderby I	2.2	Lowland	LrIA	Flint; furnace slag	Clay 1992
Fisherwick 3	R-D	Lowland	LrIA	Lots of briquetage; baked clay; slag; nozzle; broken crucible	Smith 1979
Garnston	2	Lowland	LrIA	Potsherds; bone; pot-boilers; plant remains	Knight 1992
Percy Rigg	C	Yorkshire	LrIA	Potsherds; flint scraper; saddle quern	Close 1972
Percy Rigg	D	Yorkshire	LrIA	Potsherds; saddle quern	Close 1972
Percy Rigg	E	Yorkshire	LrIA	Potsherds; rotary quern	Close 1972
Rispain Camp	2	Irish Sea	LrIA	Burnt bone; hazelnut shells; plant remains; glass fragment; iron tongs	Haggerty & Haggerty 1983
Rock Castle	1	Yorkshire	LrIA	Flint; saddle quern	Fitts <i>et al.</i> . 1994
Rock Castle	2	Yorkshire	LrIA	Small, jet drum bead	Fitts <i>et al.</i> . 1994
Thorpe Thewles	Central 3	North Sea	LrIA	Saddle querns	Heslop 1987
Thorpe Thewles	D	North Sea	LrIA	Beehive quern	Heslop 1987
Thorpe Thewles	R	North Sea	LrIA	3 crucible fragments	Heslop 1987
Levisham Moor D	Encl. D	Yorkshire	LrIA-RIA	Iron slag	Hayes 1983
Roxby	2	Yorkshire	LrIA-RIA	2 pot rims; 2 cattle horns; furnace base (from CS3)	Inman <i>et al.</i> 1985
Tofts, The	Hut	Yorkshire	LrIA-RIA	Potsherds; iron shears	Haselgrove <i>et al.</i> . 1989; 1990
Burradon	Central 1	North Sea	RIA	Lots of potsherds; bone & teeth; clay loomweights; tuyere	Jobey 1970
Burradon	Central 2	North Sea	RIA	Lots of potsherds; 3 sherds Spanish amphora; ox teeth; clay loomweights; tuyere	Jobey 1970
Roxby	1	Yorkshire	RIA	Potsherds; smithy scale	Inman <i>et al.</i> 1985

4.8 'Odd deposits' in occupation soil

Site	CS	Region	Period	Description	Reference
Green Knowe	2	North Sea	MBA	Potsherds; bone; flint; ?saddle quern; rubbers & pounders; ox teeth; antler fragment; lignite pendant	Jobey 1978-80
Green Knowe	8	North Sea	LBA	Bone; amber bead	Jobey 1978-80
Dinorben	12	N. Wales	LBA	Potsherds; bone; saddle quern; iron bar	Savory 1971
Dinorben	21	N. Wales	LBA	Bone; saddle querns; antler tool	Gardner & Savory 1964; Savory 1971
Thwing	1	Yorkshire	BA/IA	Potsherds; flint; saddle quern; rubbers; hammerstones; whorls; loomweights; shale bracelets; beads	Manby 1980; 1985
Conway Mountain	4 Ph. 1	N. Wales	BA/IA	Pot-boilers; rubbers; 3 whorls; 400 slingstones	Griffiths & Hogg 1956
Caynham Camp	W-S/Oval	N. Wales	IA	Potsherds; burnt bone; small glass bead	Gelling 1962-63
Colfryn	7	N. Wales	EIA-Lr/IA	5 bronze crucible fragments	Britnell <i>et al.</i> 1989
Dinorben	9	N. Wales	EIA-Lr/IA	Bones; saddle quern; worked antler; human cranium fragment	Savory 1959; 1971
Ballacagen Lough A	Ph. I-III	Irish Sea	Lr/IA	Potsherds; flints; ?crucibles; glass moulds	Bersu 1977
Ballacagen Lough	Ph. I-II	Irish Sea	Lr/IA	Flints; burnt clay moulds	Bersu 1977
Ballanorris	Ph. II-III	Irish Sea	Lr/IA	Potsherds; flint; 15 metal mould fragments; glass mould; slate bracelet; perforated disc; iron pin, adze, knife, awl, & bars	Bersu 1977
Close ny chollagh	2	Irish Sea	Lr/IA	Pointed bone; 2 bronze crucible fragments; flint strike-a-light	Gelling 1958
Kaimes Hillfort	2	North Sea	Lr/IA	Potsherds; bones; loomweight; whorls; stone lamp	Simpson 1969
Catterick Race Course	A	Yorkshire	Lr/IA	Slag; iron objects	Moloney 1996
Breiddin	R3-R4	N. Wales	Lr/IA	Pot sherd; 3 sherds briquetage; pebble tool; whorl; burnt emmer & spelt; iron tang, point, & knife	Musson <i>et al.</i> 1991
Dùn Cùl Bhuirg	1	Highland	Lr/IA-RIA	2 potsherds; bone; yellow glass bead	Ritchie & Lane 1978-80
Bridge House	2	North Sea	RIA	Glass pendant	Jobey 1960
Gubeon Cottage	1	North Sea	RIA	Potsherds; pounder; coal; 2 tall, glass cup bases	Jobey 1957
Huckhoe	A5	North Sea	RIA	Potsherds; samian; lead drippings; iron cinder; coal	Jobey 1959
Murton High Craggs	S2	North Sea	RIA	Potsherd; shale bracelet	Jobey & Jobey 1987
Crossgates	4	Yorkshire	RIA	Potsherds; ox & sheep bones; 2 Roman coins; 2 whetstones	Rutter & Duke 1958
Din Lligwy	2	N. Wales	RIA	Potsherds; Gaulish Potsherds; bones; shells; Roman jug; 3 stag horn points; arrowhead; silver ingot; slag; iron ring, ball, eye; slate; tile	Baynes 1908; 1930

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